Food Manufacture

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Canning Whale Meat.

CLAIMING TO have set a record for the number of whales caught during a season, the Norwegian whale factory ship, *Thorshammer*, recently docked at Cape Town after six months' cruise in the Antarctic. The factory ship took 1,065 whales during the season and in the holds of the vessel were 19,500 tons of whale oil, roughly equivalent to 117,000 barrels.

The *Thorshammer* is, according to reports, the only vessel in the world canning whale meat. During the season about 10,000 tons of whale meat were canned, and it would seem that this new canning industry is promised a rather bright future. It is said that whale meat tastes and smells very much like cooked rump steak.

Beef and Vitamin G.

At the April meeting of the American Chemical Society, Paul L. Day gave the results of experiments to determine the vitamin G content of various parts of beef.

Young rats 30 to 40 grams in weight were given a vitamin G deficient diet consisting of: Purified casein (Sherman and Spohn) 18 per cent., salt mixture (Osborne and Mendel) 4 per cent., butter fat 8 per cent., cod-liver oil 2 per cent., and starch 68 per cent. Vitamin B was supplied by an 80 per cent. (by weight) alcoholic extract of rice polishings. This extract was incorporated in the basal diet by evaporating it down on starch, and enough of this used in making up the diet so that 100 grams of diet contained the extract of 25 grams of rice polishings. The rats were given this diet *ad libitum* until growth ceased (about two weeks) and were then given daily graded doses of the meat to be tested for a period of eight weeks. Fresh beef liver was found to contain about the same amount of vitamin G as dried yeast, and to be approximately ten times as rich as beef muscle (round steak). In the order of their vitamin G content the parts of beef examined ranked as follows: Liver, kidney, heart, muscle.

Corrosion Research.

E. F. Kohman and N. H. Sanborn, of the Research Laboratory, National Canners' Association, Washington, presented a paper on Acidity and Corrosion in Canned Fruits to the April meeting of the American Chemical Society, in the course of which it was stated that their previous articles have shown that, contrary to common belief, tin in a can of fruit is a less noble metal than iron. The various factors that might influence the relative potential of these metals have been indicated; acidity may be such a factor. Kohman and Sanborn now have further data which show that equal pH's brought about by different acids may have quite a markedly different effect, and they propose to present data showing the specific effect of various acids in various products. A given acid such as citric acid may cause over a given range of pH a materially different result in a simple water solution from that produced over the same range of pH in a given fruit. They propose, if possible, to show the nature of the components of the fruit which causes acids to produce these different effects in different media.

Xylose Sugar.

At the April meeting of the American Chemical Society, Mr. Walter T. Schriber stated that xylose, a five-carbon sugar, has been successfully produced, on a semi-commercial scale, with standard equipment, from cotton seed hull bran. The process developed is simple and practical. It consists in first washing the bran with hot water under 15 pounds pressure, followed by a cold dilute sulphuric acid wash. The bran is then extracted with dilute sulphuric acid at 10 pounds pressure. This extract is neutralised with lime, concentrated under reduced pressure and crystallised. Xylose crystals are separated by centrifuging.

The by-products obtained in the process are, respectively, gums, potash salts, and well washed celluloses.

The conversion cost of crystalline xylose is about five cents per pound. This figure includes only chemical, heat, power and water costs.

"Food Poisoning."

A paper by H. Williams (*Journ. Amer. Med. Assoc.*, 1930. Vol. 94, No. 9, p. 627) records an outbreak of acute cyanide poisoning in an hotel in Utica, where about thirty persons became acutely ill after dinner. None of the cases were fatal. There was no evidence that the illness was due to food poisoning, but an examination of a powder used for cleaning silverware was found to contain over 20 per cent. of sodium cyanide. It was ascertained that similar cases of poisoning had occurred in other hotels where this powder was in routine use. It is stated that the utensils were usually dipped in a solution made from the powder once a week and it is suggested that insufficient rinsing in water afterwards might result in ingestion and poisoning of the person who next used them. Legislation has been introduced in certain States of U.S.A. forbidding the use of such cyanide preparations in polishes.

Soya Flour.

The manufacture of soya flour is to be inaugurated in Manchuria. It is reported that the Anglo-Chinese Eastern Company, a British concern, is about to place upon the market a bean meal ground directly from soya beans by a special method. The ground product will contain not only the nitrogenous substances of the soya bean but also the oil, which is not extracted. This meal is to be mixed with wheat flour in baking, and claims to add taste and nutritious value to the bread, besides lowering its cost. The meal will also find application as seasoning in soups, etc. The British firm introducing the product upon the local market believes that it will in time become an important article of export from North Manchuria.

It is reported that the Siberian Company Limited, which has been a very important factor in the soya bean trade between Manchuria and Europe, has ceased and retired from the field. It is believed that this action was influenced very largely by general economic conditions prevailing in Manchuria at the present time, and the unfavourable outlook for the immediate future. The opinion has been expressed that the withdrawal of this firm will have little if any effect on the North Manchurian market.

Transport of Fish.

Tanks for carrying five tons each of live fish are now being constructed for the Norwegian State Railways for the conveyance of salt water fish between various parts of Norway. The patent used is the Arne Flekstad Patent, whereby the salt water used for conveying the fish is filtered and oxygenated during transport. Successful trial runs were recently conducted between Trondhjem and Oslo, which is a distance of about 300 miles.

Food Preservation.

In the *Behre. Chem. Zeitung.*, 1930, pp. 325-327 and 346-347, the question of food preservation in general is discussed. The author advocates the use of food preservatives during the summer months, particularly for fatty and fish foods. Reference is made to a large number of chemicals that are suitable as food preservatives, together with their general characteristics, their special application to particular types of foods, patent names, their constituents and food preserving qualities.

Food from Quarries.

The granite quarrymen of Leicester have a somewhat unusual hobby which is adding, in a small way, to the food producing capacity of the country. According to the *Stone Trades Journal*, 1930, 49, 12, p. 531, men who are engaged in drilling, blasting and crushing hard granite in the various quarries in Leicestershire very carefully cultivate watercress in their spare time, in spots where there is running water. It is stated that each of these assiduous gardeners so cherishes his watercress bed that one might almost think it was a diamond mine. Anyone attempting to jump the claim is dealt with summarily by a sort of rough and ready lynch law in which a pickhandle plays no small part. The plant, which will grow anywhere, thrives in the water issuing from the quarry walls and finds a quick market. That it is an excellent foodstuff appears to be indicated by the splendid health and striking vitality of those quarrymen who eat large quantities of the vegetable.

Cacao Butter.

In the course of a review of a recent book by Dr. H. Fincke (*Die Kakaobutter und ihre Verfälschungen*), A. W. Knapp points out that the peculiar properties of cacao butter (*e.g.*, brittle fat melting fairly sharply at 33° C.) make it difficult to imitate, but as it is the most expensive of the commercial vegetable fats, many attempts have been made. Hence the fullest information as to methods of analysis is desirable. Those seeking an explanation of the properties of cacao butter may find it in C. H. Lea's conclusions that it contains at least 50 to 60 per cent., of oleopalmito-stearins.

In his book, Dr. Fincke sets out the present knowledge concerning the composition of cacao butter, and deals in considerable detail with such matters as the methods of examination of edible fats as applied to cacao butter, viscosity, possible adulterants, testing—including the application of ultra-violet rays.

Pasteurised Dried Fruits.

Carl R. Fellers, in the *Amer. Journ. Pub. Health*, vol. 20, Feb., 1930, discusses briefly certain public health aspects of dried fruits. These are said to harbour considerable numbers of moulds and bacteria and a few yeasts; it is therefore of importance to protect the public against bacterial infection from these foods. At least one such outbreak has been reported.

Experimental work has been carried out with pasteurisation in the laboratory after inoculation of the fruit with pathogenic organisms. The results of this investigation are summarised as follows:

"Dried fruits such as dates, raisins, figs, apricots and prunes may be pasteurised in paper cartons with moist heat at controlled temperatures and humidities. In general, different treatments are required for each fruit and often each variety must be handled a little differently. Temperatures which have been found effective in greatly reducing the total numbers of micro-organisms on dried fruits at humidities of 70 to 100 per cent. vary from 150° to 185° F. for 30 to 70 minutes. *Escherichia coli* and *Eberthella typhosum* were destroyed in every case where the temperature of the fruit remained at 160° F., or above, for 30 minutes at relative humidities of 75 per cent. or more. Commercial processes for the effective pasteurisation of dates, figs and raisins are now being developed or used. Sulphured fruits harbour very few organisms because of the inimical effect of the sulphur dioxide. Acid fruits are more easily pasteurised than those of the higher pH."

From a public health view-point, pasteurisation marks a definite advance in the merchandising of dried fruits.

Aluminium and Vitamin C.

At the April meeting of the American Chemical Society, Schwartze, Murphy and Cox, of the Mellon Institute of Industrial Research, gave the results of their enquiry into the effect of pasteurisation upon the vitamin C content of milk in the presence of certain metals.

Vitamin C content of milk was reduced during ærobic pasteurisation 80 to 90 per cent. in naked copper, 20 to 40 per cent. in aluminum, and slightly more in tinned copper than in aluminium, probably because of slight exposure of copper in worn parts. It has been shown previously that glass and aluminium are equally inert in the destruction of vitamin C. Dairy equipment should be constructed of solid metals that best meet physiological requirements of non-alteration of milk. Naked copper is decidedly objectionable. Aluminium fulfils the public health requirements, as do also pyrex glass and, very probably, block tin; but tinned copper does not because of its tendency toward exposure of copper.

Potatoes and Pork.

Experiments recently carried out at the Kirton Farm Institute, Holland, Lincs., have gone to prove that potato "chats" are excellent feed for bacon pigs, and may be used successfully to replace all or a part of the barley and maize meals generally employed for the purpose. One prominent feature of the change is that while barley meal was costing £12 a ton and maize £10, the cooked potatoes only cost £1 6s. 8d. per ton. Although the dead weight of the pigs, as given in *Fertiliser, Feeding-Stuffs and Farm Supplies Journal*, 1930, 15, 12, p. 348, shows 15 lbs. per pig lower for those fed on potato instead of on barley and maize meal, the expert who passed opinion upon the bacon found that it was in better condition than the meal-fed, even though the appearance of the live pigs was not so good. The ration for the pen of four pigs was 10 lbs. fish meal, 25 lbs. pollards and 260 lbs. potatoes, steamed and mixed with the rest. During the last quarter of the 100 days' fattening, the fish meal, which had been gradually reduced, was dropped out altogether. This experiment can only be looked upon as a beginning and too close deductions should not be drawn from it, but it has shown that potatoes form good fattening feed for bacon pigs and that, therefore, good bacon can be produced in this country at considerably lower cost by using up the waste potatoes.

Research on Canning.

Several results of importance to canners have recently been published in the Annual Report of the Food Investigation Board. For instance, it has been found that the natural colour of canned strawberries is preserved far more satisfactorily if the cans are kept in cold storage rather than at ordinary temperature. Canned strawberries stored for three months at +1° C. had a fine red colour, whereas those which were kept at 25° C. were pale and those kept at ordinary temperatures were somewhat pale. The strawberries from cans stored for three months at +1° C. actually had a much better appearance than when they were first canned, because the colour had returned to the fruit from the syrup. This research work was done by Mr. T. N. Morris and Mr. J. M. Bryan, of the Low Temperature Research Station, Cambridge. Mr. T. N. Morris has also carried out investigations on corrosion of cans. Some substances cause tin to corrode very rapidly, whereas other substances have a retarding effect. An interesting observation is that certain samples of beet sugar have a much stronger retarding effect on corrosion than that obtained with pure cane sugars.

Lactose Determination.

A new, rapid method for the determination of lactose in milk is given by Dr. H. Gohr in *Zeit. für Untersuchung der Lebensmittel*, Jan., 1930, p. 90.

The Difference.

American candy makers are deriving much amusement from the following note which appeared in one of our trade journals:

"For selling a pennyworth of sweets twenty-five minutes after closing time on December 14, Albert Leslie Clark, confectioner, of 38 Crowtree Road, was fined 5/- by the Sunderland magistrates. A policeman saw a man coming out of the shop with the sweets. Defendant denied that anyone who had gone into the shop after 10 p.m. was served."

William Springett, who does most of the entertaining in candy circles, considers that the whole thing sounds a great deal like something that *might* have happened in the United States—except that the culprit was actually arrested and that the sweets were not intoxicating.

We would, however, point out to Mr. Springett that this is by no means the least of our troubles, as he will gather from the following notice:

"In the House of Commons on February 11, Mr. Adamson, Secretary of State for Scotland, in reply to Mr. McElwee, said: I am informed that an alcoholic concoction commonly known as 'Red Biddy' is being increasingly consumed in the poorer areas in certain districts of Scotland. I am advised that it has a most serious effect on the health of the consumer and am having the matter fully inquired into."

We have had "infernal spirits" and "whisky made in Germany," but now we have a red wine made in Scotland and fortified with methylated spirit to give it a "bite."

Cocoa Storage.

A recent Empire Marketing Board publication by Thomson and Munro deals with the insect infestation of stored cocoa, and more particularly with conditions occurring in the stores at the London docks. It gives a valuable survey of the conditions prevailing in cocoa stores in this country and the methods adopted to prevent insect infestation in general.

Insect infestation appears to take place at all stages of storage. Useful information as to its magnitude is given in the report. It is highest in cocoa products received in this country between July and October.

The financial losses due to spoilage by insects are immense. Any remedial measures must be made in co-operation with the growers. As far as this country is concerned, much of the damage is done before the products reach the London docks.

New Refrigerants.

The second report of the Committee on Poisonous Gases (see *Journ. Amer. Med. Assoc.*, June 7, 1930, p. 1832) deals with the important question of refrigerants for household mechanical refrigerators.

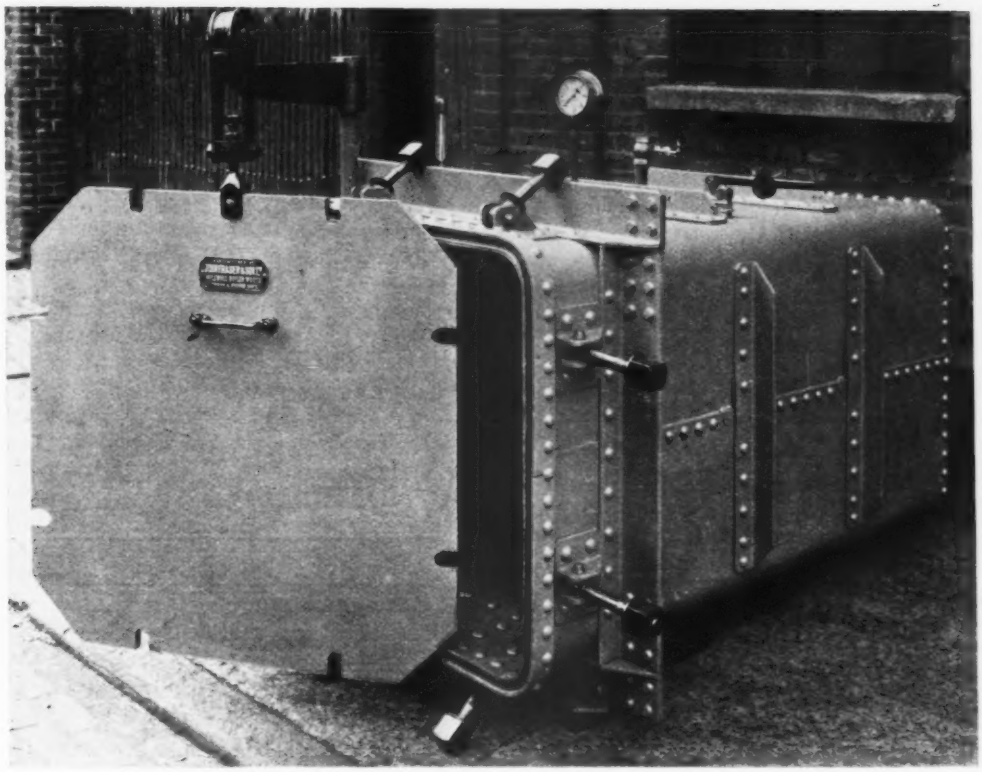
Of a large list of substances that can be used as refrigerating mediums, ammonia, sulphur dioxide and methyl chloride are the three substances most widely used. All three are regarded as definitely toxic. Both ammonia and sulphur dioxide, on account of their being respiratory irritants, serve as warning agents and so explain why fatalities from these substances have been minimal as far as their domestic use is concerned. Methyl chloride has been the one chiefly incriminated as the causative factor in the more recent series of deaths from household refrigerators. Methyl chloride has no warning properties. Its initial action is that of a narcotic, akin to the chloroform type of anæsthetic. Its secondary action is probably due to decomposition products in which the prime harmful factor is methyl alcohol, or some decomposition substances of methyl alcohol.

A new preparation—dichloro-difluoro methane (CCl_2F_2) which appears to have suitable physical properties for use as a refrigerant has been announced just at the time the Committee issued its report. The Committee reserve their opinion as to the merits of this new refrigerant, pending further developments.

Mayonnaise.

At the American Symposium on Chemistry and the Food Industries held in 1928, John Glassford, in discussing the relation of chemistry to the spice industry (see *Ind. and Eng. Chemistry*, 1928, pp. 1289 to 1327 for a report of this Symposium) pointed out that the problems of the mayonnaise manufacturer chiefly concern the preservation—mechanical and chemical—of his product in the form in which it leaves his factory.

Mayonnaise is a delicate product, sensitive to heat and cold, oxidation, and mechanical agitation. It is preserved with salt, vinegar, and spices, and recently lactic acid has been recommended for this purpose. The spices play only a minor part as preservatives. The principal problems are to preserve the oil against rancidity and the emulsion against separation. However, the potential rancidity of an oil can be detected before any actual rancidity has appeared. While great skill in making a stable product has been acquired by long practice in mayonnaise manufacture, the scientific principles of emulsification do not appear to have been deliberately applied.



Retorts and Food Preservation

By A. SAMSON, A.R.C.S., A.I.C.,
Chemist and Bacteriologist, Messrs. Poulton and Noel, Ltd.

This article should go far to convince manufacturers that the retorting practice now prevailing in this country is hopelessly obsolete, inefficient, and positively dangerous. Not content with reasoned criticism of present practice and plant, the author gives details of a new system which he has developed under factory conditions. It is felt that by the adoption of the scientific principles of retort construction and manipulation embodied in this article, more uniform and satisfactory results will be obtained, thereby opening up a new era in British retorting practice.

I.—Present Practice

IF ONE were to ask manufacturers of preserved foodstuffs—whether these be meat, fish, vegetables, fruit, milk, etc.—which department of their factory they considered to be the most important, I doubt if 50 per cent. would answer "The preserving house" or "The retort house."

Yet, it is an established fact that of all operations involved in the preparation of foods preserved by heat treatment, the one by far the most vital is that of retorting or processing—or sterilising, as it is often called.

Insufficient sterilisation will not only ruin the finest product ever packed into a container, but it will also ruin the business foundations of any establishment. Likewise, over-sterilisation can so spoil the highest quality goods as to reduce their standards to those of inferior grades.

Nevertheless, according to the general construction of retorts to-day and to the methods adopted in handling them, it does not occur to manufacturers to question the possibility of their goods being either over-sterilised or under-sterilised. They take it for granted that all is well with their retorts, and that the handling of them is correct in every detail.

It does not, however, require much evidence to demonstrate the fallacy of this assumption in the majority of cases.

Temperature Variations.

Take five or six clinical thermometers reading to 250° F., and place them in various positions in an

empty retort, one on the floor in a corner, one about half-way up, two in opposite corners at the top of the retort, and in any other position one may choose. Close the retort and bring slowly up to 240° F., and maintain at that temperature for about ten minutes. Then shut off steam and open the door. The resulting temperatures recorded by the clinical thermometers in comparison with the retort thermometer will be astounding. I have actually found 15° difference in temperature between various thermometers placed as suggested above.

I leave it to the reader to imagine what must be the effect on containers in the retort when variations even as little as 5° occur during preserving. This point alone is sufficient reason why it is absolutely essential that the closest observation be given to the operations conducted in the retort house.

The Importance of Retorting.

If the leaders of the industry would only realise how important is the whole idea of retorts, their function and manipulation, I am sure they would not hesitate to remedy any existing state of affairs if that is not what it ought to be.

Little is it realised that bad retort operation contributes very largely to blown tins and glasses, overcooked goods, buckled tins and, in many cases, burst tins. I feel confident that if this was more fully appreciated, the retort house would then receive its due share of attention.

It is not suggested that the retort house is at the root of all troubles of the preserved food manufacturer. There are many other operations where things may go wrong. Nor is it suggested that if anything goes bad it is the preserver's fault; but it must be fully realised by the leading members of preserving concerns that although the retorting operation is the final one in a series of operations, it nevertheless comes first and foremost in the production of "the article."

Types of Retorts.

In this country the most popular retort is the horizontal type. This is generally 3 feet by 3 feet by 6 feet deep. It has a steam line entering the retort through the top, and a drain line at the bottom. In the front top portion are placed the thermometer, the pressure gauge, and the safety valve (see photograph above).

The vertical circular retort is not much used in this country.

Retorting Operations.

In order to understand what principles are involved in the operation of "retorting," it will be as well to follow through the whole process of preserving a load of material in a retort, the actual manipulation by the preserver, and the effects produced inside the retort.

The material is loaded into the retort, sometimes to its fullest capacity. The door is bolted down. The preserver opens the drain-cock fully, and also completely releases the safety valve. He turns the steam valve full on. There is a strong rush of air through the open safety valve. At intervals the preserver places his hand over the safety valve, in order to feel when, in his opinion, all the air has been expelled from the retort and steam is entering. He closes the safety valve, but leaves the drain valve open to allow the condensate to run off, and then when steam is passing through it, he closes it halfway, allowing the condensate as well as a volume of steam to pass through during the process.

Meanwhile the temperature is rising, and since the steam valve is fully open, the pressure in the retort is increasing, with the result that, although the thermometer may show only a low temperature of about 150° F., the pressure gauge may record anything from 5 to 10 lbs. per square inch. Eventually, the thermometer reaches the required temperature—say 240° F. The preserver now shuts his steam right off, then "cracks" it to a certain position, which he has found by practice. The pressure gauge may still show a much higher pressure than the equivalent of 240° F.—namely, 10 lbs.; generally it reads 12-13 lbs. per square inch. After a while this high pressure drops to 10 lbs. per square inch.

The retort may now be imagined to be running in the "steady position"; *i.e.*, the pressure gauge shows a steady 10 lbs., and the thermometer, *as far as the preserver is concerned*, shows 240° F., and there is just sufficient steam entering the retort to maintain the interior at 240° F.

(I emphasise the words "as far as the preserver is concerned" because there are very few preservers who judge their temperatures by the thermometer—they are guided by the pressure gauge! Thermometers seem to be consulted only in those concerns which have recording thermometer installations.)

The "holding period" at 240° F. having elapsed, the preserver proceeds to stop the process. He closes his steam valve, opens fully his drain pipe, and blows off his safety valve by releasing it as quickly as possible. In consequence, both the temperature and the pressure drop rapidly to 212° F., and atmospheric.

The retort is then opened and the goods may be removed. This is the whole cycle of operations.

Looking at these operations from a scientific point of view, they deserve nothing but condemnation. The general construction of retorts, as they exist today, is entirely wrong, and only helps to produce bad results, whilst the manipulation of the retorts by the preservers generally helps to make matters worse. I shall criticise the retort first.

Conditions inside the Retort.

Since the steam enters the retort through the top, the greater the quantity of material packed into the

retort, the less is the opportunity to produce efficient steam circulation.

The containers baffle the steam, with the result that in the centre of the pack we may find totally different temperatures from those prevailing in other parts of the retort. Furthermore, those tins in the immediate vicinity of the steam pipe receive the bulk of the steam first, so that they may be so overheated as to be commercially over-sterilised.

Moreover, since the safety valve will be blowing freely, the steam that enters will tend to take the path of least resistance; hence there will be a general tendency for the incoming steam to flow towards the safety valve, and, as the thermometer is near the safety valve, there is every possibility that the thermometer will register a higher temperature than may actually exist in the body of the retort.

This temperature variation is more evident when the "holding period" is reached—when the quantity of steam entering the retort is small, the steam valve being only "cracked."

Another serious source of trouble during preserving is the "dead area." This may consist of a pocket or area of steam, or steam and air mixture, which is at a different temperature from the main bulk of the retort, and owing to the general nature of things, these "dead areas" have great difficulty in mixing with the bulk steam and so producing uniform temperatures within the retort. Unfortunately, the horizontal retort is very prone to producing these "dead areas." The corners of the retort assist in their formation, and it is in the corners that we find the greatest temperature variations. Containers which find their way into the corners during packing will receive temperatures of processing which cannot in the least be gauged by the thermometer temperature.

Summarising the effects of the retort construction on the heat treatment, it will be seen that the main failing is one of producing proper and efficient steam circulation. Whether the retort be full or empty, the constructional details are such that one cannot obtain uniformity of temperature. Moreover, the thermometer is more often than not at such variance with the general temperature prevailing in the retort that the whole idea of fixing definite temperatures of sterilisation borders on the ridiculous.

The foregoing will serve to show not only how erroneous, but also how extremely dangerous, it is to assume uniformity of conditions in the retort.

First Stage of Retorting.

I pass on to consider the preserver himself and the faulty manipulation he may apply during the processing.

In the first place it is wrong to turn steam full on at the commencement of operations. The reason is that a pressure is built up in the retort long before the containers have had any heating which will enable them to withstand this pressure.

It is very often possible to see the pressure gauge showing a pressure of 5 to 15 lbs. per square inch when the thermometer may read no more than about 140° to 150° F., five minutes after the process has started. This pressure is undesirable and dangerous. It will buckle tins, because, since they are not really hot, the tins have built up no internal pressure, and many of them find it extremely difficult to withstand the pressure of 5 to 15 lbs. in the retort. The consequence is, they collapse and become buckled tins. Tins are very liable to buckle along side seams, and the extra pressure is simply and surely helping them to collapse at their weakest points.

Temperature Readings.

The next serious fault is the preserver's judgment of the temperature. It is only too true that the majority of preservers judge their temperatures by their pressure gauges! If their thermometer readings do not correspond with their pressure gauges, then their thermometers must be wrong! Little do they realise that they can commit more serious errors by observation of pressure gauges. Air may be trapped, showing, in consequence, a higher pressure than the true steam pressure.

Pressure gauges on retorts are not so accurately tested as to warrant unquestioned acceptance of their readings. To be accurate, gauges should be large and should read to $\frac{1}{4}$ lbs. per square inch.

Final Stage of Retorting.

A third very serious fault of most preservers is to be found in their manipulation of the final stage of the processing operation, when they turn off their steam and release the pressure in the retort as quickly as possible.

Let us examine the folly of this, as this act is one of the chief causes of burst tins. The tins and contents having been entirely heated, and the material having expanded, great pressure has been generated in the tins. Sometimes this pressure may be as much as 30 lbs. per square inch when processing at 240° F. But it must be remembered that while the retort is at 240° F. there is steam pressure in the retort of 10 lbs. surrounding the tins. Hence the effective pressure in the tins is reduced by 10 lbs.—*i.e.*, 30 to 20 lbs. per square inch. Now, assuming the preserver blows his steam pressure off rapidly, it will be realised that the tin is suddenly released from this external pressure of 10 lbs., with the consequence that the pressure in the tin rises suddenly 10 lbs. up to 30 lbs. per square inch. This sudden excessive pressure is more often than not the cause of burst tins, burst seams, torn soldering. There is too much strain suddenly placed on the cans, often with disastrous results.

II.—A New System of Retorting

Having now criticised the construction of the retort and the methods adopted by the preserver, I propose to show how it is possible, by suitable modifications, to produce the best possible results.

Steam Distribution.

In the first place, the ideal to be aimed at with regard to the retort is efficient steam circulation, and the best way to attain this is to allow the steam to

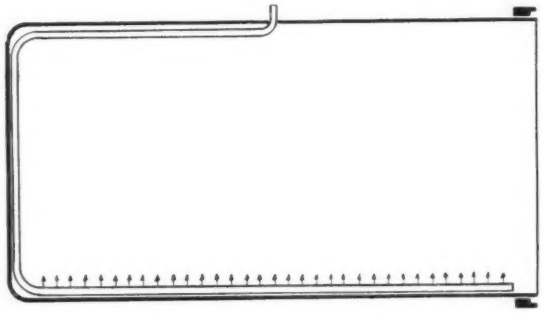


FIG. 1.—Side Elevation showing Steam Pipe.

enter the retort from the bottom. This is done by running a length of piping from the steam inlet at the top of the retort into the interior, along the top,

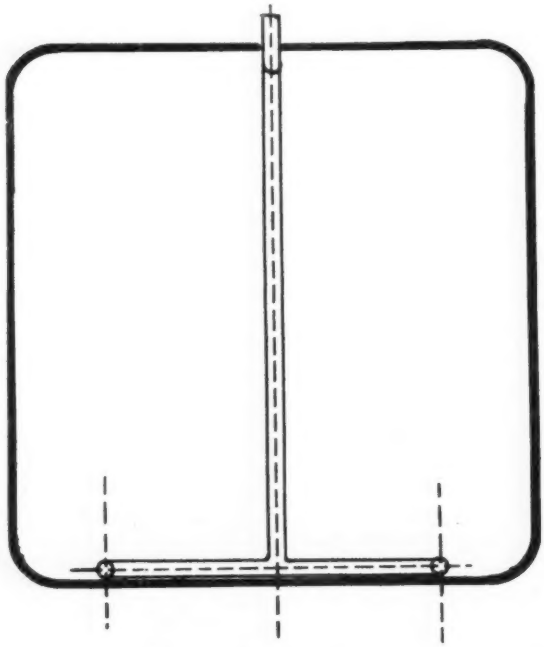


FIG. 2.—Elevation looking into Retort towards Back.

down the back centre, and then dividing it into two arms running along the floor of the retort. Each arm should be about 8 to 10 inches from the side of the retort. Only the piping along the floor is perforated, the holes being $\frac{1}{8}$ inch in diameter and placed on alternate sides of the piping, the pitch between holes on the same side being 2 inches. These holes are drilled at an angle of 10 degrees from the horizontal in order to direct the steam outwards and upwards. If one were to turn on steam with such a system one would see the whole of the retort filled with steam in a few seconds, and the steam would have a tendency to travel from the bottom right to the top.

Fig. 1 shows the side elevation of the steam pipe running into the retort along the top, down the back, and along the floor of the retort.

Fig. 2 shows the steam pipe running down the centre of the back and then branching at the bottom into the two arms.

Fig. 3 shows the steam-pipe branches running along the floor of the retort. It also shows the alternate spacing of the holes in the pipe, the holes on the same side being 2 inches apart. The ends of the perforated arms are capped.

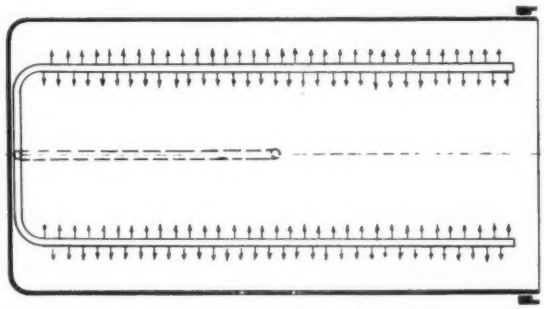


FIG. 3.—Plan showing Steam Pipes along Floor of Retort.

Fig. 4 is a cross-section of the perforated steam pipe showing the angles which the holes make with the horizontal.

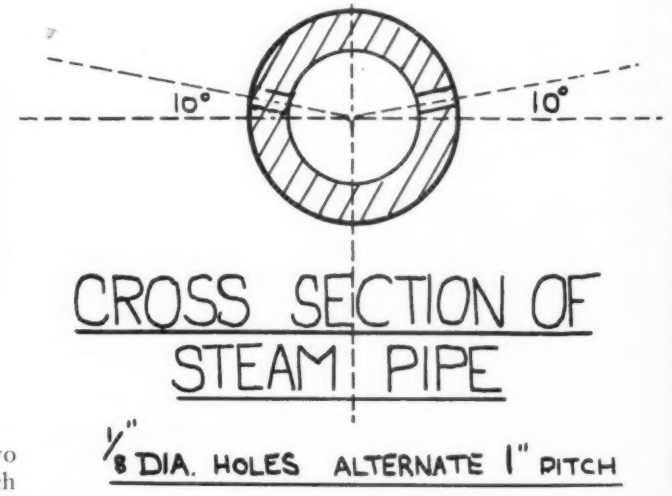


FIG. 4.

Steam Circulation.

So much for the efficient distribution of the steam which is essential to produce proper circulation. In order to ensure that the steam circulation in the retort is satisfactory, it is necessary to keep the steam in movement and also necessary to remove any air that may be trapped in the retort. This is done by the introduction of pet cocks or bib cocks. These are $\frac{1}{4}$-inch cocks which are fitted into the shell of the retort in determined positions. During the operation of processing they are always left slightly

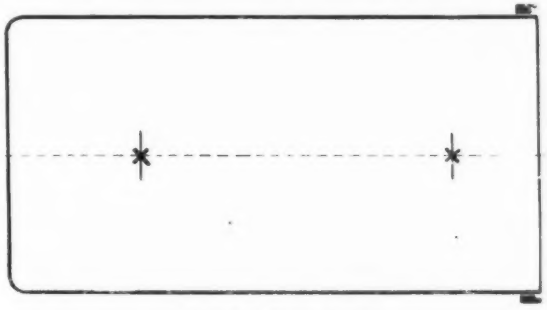


FIG. 5.—Plan of Top.

open to allow a small escape of steam. This escape frees the retort of trapped air and allows the movement of steam in the retort, and hence permits circulation. It will be noticed in the accompanying diagrams that all the pet cocks are situated above

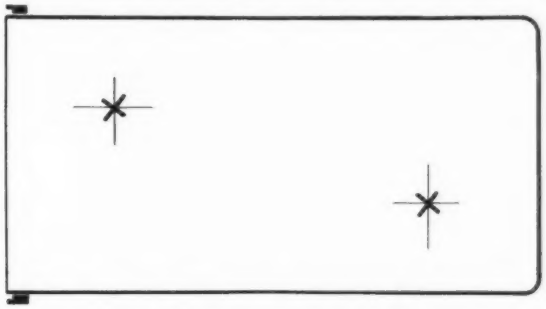


FIG. 6.—Elevation of Right Side.

the steam pipes. This is purposely the case, as the open pet cocks have a pulling action on the steam, and so tend to draw the steam right through the contents of the retort when packed. In order that there may be perfectly free circulation round the thermo-

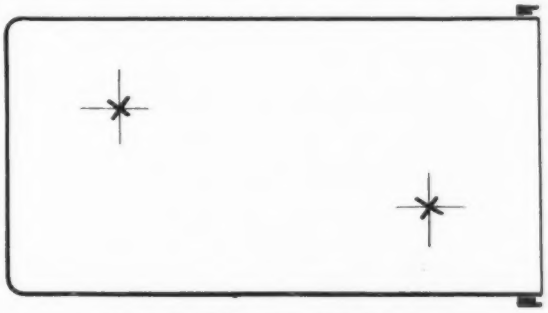


FIG. 7.—Elevation of Left Side.

meter and the pressure gauge, one of the pet cocks is placed between the two instruments. This is shown in Fig. 5. The other pet cock is placed about 3 to 4 feet further back on the top.

Fig. 6 shows the approximate position of the pet cocks on the right side of the retort. It will be noticed that they will permit a free circulation of steam, especially in the corners.

Fig. 7 shows the approximate position of the pet cocks on the left side, these also venting the corners.

Fig. 8 shows a complete right-hand view of the retort with the pet cocks in position.

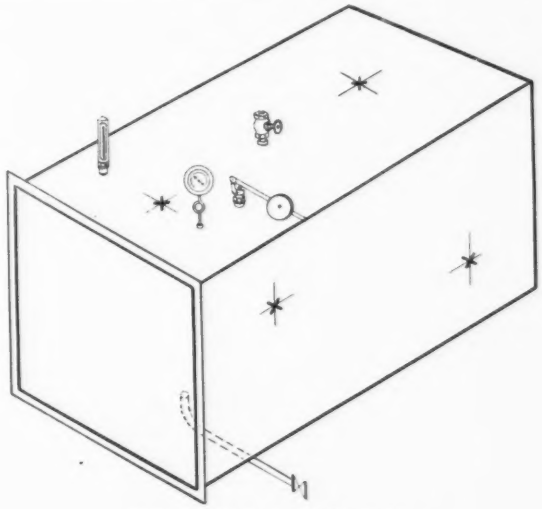


FIG. 8.—Right-hand Elevation.

Fig. 9 is a complete left-hand view of the retort.

It will now be realised that we have an ideal system for introducing steam to all parts of the retort, and an efficient system to promote thorough circulation of the steam.

I have conducted many tests with this system, and have found no greater variation in any part of the

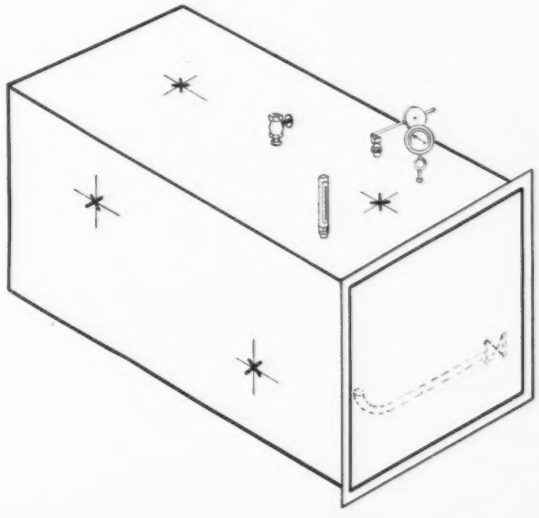


FIG. 9.—Left-hand Elevation.

retort than 1° F., whether loaded or empty. Furthermore it is easier to manipulate the retort during the preserving operation, merely by opening or closing slightly one or two pet cocks.

Manipulation.

Now for the methods to be adopted by the preserver to secure best results.

In the first place, the safety valve must not be interfered with. This valve should be set to the pressure desired, so that when the corresponding temperature is reached it is slightly blowing off. A safety valve is a precautionary measure—not a blow-off. Very often there is almost sufficient steam blown out of the safety valve to run another retort.

At the commencement of operations, when the retort has been packed and the door locked, the safety valve is set and all the pet cocks are fully opened. The drain valve is also fully opened. The steam valve is now opened half-way. At no time must any pressure be built up in the retort until the thermometer shows 212° F. During this preliminary coming-up period, air will be forced out of the pet cocks and eventually steam. As soon as steam is emitted the pet cocks are cut down to half, as also is the drain valve. If, however, pressure is produced before 212° F. is reached, the steam valve must be cut down slightly and the pressure released through the pet cocks. When the temperature of 212° F. is reached, the pet cocks are almost closed, a small flow of steam indicating they are just open. The drain valve is cut down so that the condensate can escape as well as some live steam, but very little of the latter. Eventually the desired temperature will be reached and the steam valve can then be "cracked." *All the pet cocks and the drain valve must remain slightly open and blowing during the whole of the process.*

By this method it will be found that, although the pet cocks are emitting steam, the quantity of steam lost is very small and is less than the old method of blowing the safety valve and the drain valve.

There will now be efficient circulation in the retort and all the containers will be receiving the same heat treatment.

At the completion of the operations, the preserver closes his steam valve. Then he fully opens one pet cock at a time, at intervals of one or two minutes between each, thus releasing his pressure in the retort very slowly. This is essential in order to prevent burst tins.

The pressure gauge will eventually reach zero after about 7 to 10 minutes, and the drain valve and the door can then be completely opened. This is the safest method. There is no advantage in speeding it up. The operation of coming-up and cooling-down may take 5 to 10 minutes longer than the old way which I condemn, but it is certainly worth it. There are no sudden jars or shocks given to the containers.

Thermometers and Pressure Gauges.

Before closing, I wish to stress the point of thermometers. Preservers must be made to realise that all temperatures must be read from the thermometer, and not guessed from the pressure gauge.

All thermometers should be tested at least once every twelve months, and if possible twice a year.

Furthermore, the thermometer bulb should project as much as possible into the steam area of the retort, and the steel or brass casing surrounding the bulb should be well perforated to allow free access of the steam to the bulb.

Pressure gauges should be at least 5 inches in diameter, and should read from 0 to 30 lbs. per square inch with 1 lb. per square inch divisions. These should be tested at least once a year.

(*Continued from page 226.*)

The Future of Curing.

Curing is still an art and not a science. Very few factories possess a laboratory, and the only scientific instruments usually found are thermometers and salinometers. The future of curing undoubtedly lies in securing more adequate control over the various processes. Moreover, we need more exact knowledge, not only of curing, but also of all the stages that the pig goes through from germ cell to carcase. As regards the curing process, we still know very little about the chemical and physical effect of the curing materials on the meat. We know practically nothing about the most favourable micro-flora, although undoubtedly micro-organisms play an important part in curing. Some kind of bacteriological control is highly desirable.

When the science of curing becomes more advanced the curing industry will gain in many ways. There will be a greater insistence on the control of temperatures at every stage of manufacture. Great care will be taken to prevent undesirable micro-organisms from entering the pickle or meat. Pure cultures of bacteria will be grown to act as "starters," and the time will come when we shall marvel that our forefathers managed to produce ham and bacon with the crude appliances and rule-of-thumb methods which are now almost universal.

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‡ Bernheim, F. and M Dixon., *Biochemical Journal,* 1928, vol. 22, p. 125.

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‖ Lewis, W. L., Vose, R. S., and Lowry, C. D., Jr., *Ind. and Eng. Chem.,* 1925, vol. 17, p. 1243.

The Curing of Bacon and Ham

By E. H. CALLOW, Ph.D., B.Sc., F.I.C.

HAM AND bacon are such familiar articles of food that we are in the habit of taking them for granted. We know that they are prepared from pork, and there is an end of the matter. The actual change from pork to bacon or ham is, however, by no means as simple as it sounds. Bacon and ham are not just salt pork. Salt pork has merely been salted, but bacon and ham have been cured. What then is curing?

The story of curing actually starts in the factory, but the previous history of the pig has a profound effect on the quality of the resulting bacon or ham. Pigs intended for the use of the curer should be of the proper breed. Agriculturalists, especially Continental agriculturalists, have paid great attention to this point (see the Ministry of Agriculture's valuable handbook entitled, *Report on the Pork and Bacon Trades in England and Wales*). Equally important is the feeding of the pig. The food must be such that the pig is not too fat, nor the fat itself soft. Unless the farmer supplies the curer with pigs of the desired standard the curer cannot make good bacon.

Preliminary Procedure.

The pig is killed by hanging it upside down and "sticking," an operation which causes it to bleed to death very quickly. This rapid removal of blood leads to unconsciousness in two or three seconds because the blood is withdrawn from the brain. Curiously enough, pigs make less noise in departing this life than they do at feeding time. Bleeding is an important operation, and if it is not done thoroughly there will be grave risk of putrefaction setting in later. When the pig has been bled it is scalded and scraped. It is then singed in a furnace and again scraped, this time under a spray of cold water. When the pig emerges from these operations it looks wonderfully clean and white. The skin has been reduced to the thickness of rind, and it is said that changes have occurred in the fat which will improve its final appearance.

At this point the butcher plays his part and rapidly transforms the pig into a carcase. A skilful butcher has the sure technique of a surgeon. On the other hand, a careless butcher may not only mar the appearance of the carcase, but may also introduce bacteria into the flesh and thus be responsible for future troubles. In this country carcases are given a preliminary cooling by hanging in a well-ventilated room at ordinary temperatures. The practice in America, however, is for the carcases to be placed immediately in a chill room at 32° F. or thereabouts. In this country the final cooling in a chill room is delayed until the day after killing. When cooled, the carcases undergo the final trimming operations, such as removal of feet, shoulder blades, etc., and their shape becomes that of sides of bacon.

Curing Operations.

The pork is now ready to undergo the actual curing process, which consists of three operations; these take place in the curing cellar, which is kept at a temperature round about 42° F. First of all, the sides are pumped with pickle, which is a solution of salt and saltpetre and occasionally sugar. The pickle is pumped under pressure into various parts of the sides by means of a large hollow needle, which is connected with a reservoir of pickle under pressure. The next operation depends upon the type of cure. If the meat is to be dry-salt cured, it is sprinkled with salt and saltpetre and built up into stacks of about eight sides, skin side downwards. If, on the other hand, the bacon is to be tank-cured, it is stacked in large vessels and covered with a pickle of salt, to which saltpetre is often added. The dry-salting operation takes about 10 days, whilst tank-curing only takes 4 to 7 days. The final operation is the same in both cases. The sides are removed from the salt or pickle, and stacked, skin side upwards, on the floor of the curing cellar to drain and mature. This operation takes about a week for tank-cured bacon and a fortnight for dry-salt cured bacon.

The Mechanism of Tank-curing.

Since tank-curing is easier to understand than dry-salt curing, we will consider the changes which take place while the sides of pork are in the curing tank. The pickle in the tank is a very strong one, containing not less than 25 per cent. of salt and about 1 per cent. of saltpetre. The most important changes in tank-curing are those which occur in the lean part of the meat. In the first place, salt diffuses into the meat and water diffuses out. The rates at which these substances diffuse depend on the temperature and the concentration of salt in the pickle. A stronger or warmer pickle will show more rapid rates of diffusion than a less concentrated or cooler pickle. Saltpetre will diffuse into the meat, but probably at a slower rate than the salt. The soluble substances in the lean of the meat will gradually diffuse into the pickle. Among such substances will be phosphates, lactates, extractives, such as creatine and carnosine, and other nitrogenous compounds, such as proteins, etc. The salts and simpler organic com-

pounds diffuse out more rapidly than the proteins, which have large molecules. The meat thus tends to gain weight by taking up salt, and to lose weight by the loss of water and soluble substances.

The loss of proteins and other substances is, of course, serious, as it represents the loss of valuable foodstuffs and of flavour. In actual practice, however, the loss of proteins, etc., is minimised by the use of old pickles. The strength of the pickle is adjusted, when necessary, by the addition of salt and saltpetre before the pickle is used for fresh sides of pork. Each time that meat is placed in the pickle, proteins and other substances diffuse out of the meat into the pickle. Consequently, the pickle becomes more concentrated in this respect, and older pickles, therefore, remove less protein and other substances from the meat than do new pickles. For this reason alone the practical man is justified in his preference for old pickles.

As the pickle ages, various other changes occur. A highly specialised micro-flora develops. The type of micro-organism which predominates will depend on a very delicate balance of factors, such as temperature, concentration of salt and saltpetre, etc. These factors may vary from time to time, and from factory to factory, and may cause considerable variations in the typical micro-flora of the pickle.* In successful tank-curing, however, one important change invariably takes place as the result of the growth of micro-organisms. The saltpetre (KNO_3) is changed to nitrite (KNO_2). Old pickles always contain nitrite and are clear red in colour. The significance of this will be discussed later.

Maturation.

After treatment with pickle the meat thus contains salt, saltpetre, nitrite, and perhaps sugar. The sides are then allowed to drain, and are left in the curing cellars for a further week or fortnight to mature. The process of maturation is the most important and the least understood of all the stages of curing. It is necessary for both bacon and ham. During maturation the salt, saltpetre, nitrite, and possibly sugar gradually diffuse through the meat, so that the concentration tends to become more uniform than it was originally. This process never reaches completion, and all samples of bacon or ham show distinct differences in salt content from point to point. This is a possible method of judging a curer's technique. The more evenly the salt is distributed through the bacon or ham the more satisfactory has been the cure.

During maturation the appearance of the meat alters. The colour of the flesh changes from the dull pink of pork to the peculiar reddish tint of bacon. The formation of nitrite from saltpetre continues, and at the same time the characteristic flavour of bacon is developed. It is possible that the flavour may be partly due to the growth of specific micro-organisms.

Colour.

As long ago as 1901, Professor J. S. Haldane† pointed out that the colour of uncooked cured meat is due to nitroso-hæmoglobin, a pigment which is formed by the action of nitrite on hæmoglobin, the red colouring matter of blood, in the absence of oxygen. At the same time he showed that the colour of cooked cured meat (for example, boiled ham) is due to a related pigment called nitroso-hæmochromogen. He also suggested the possibility that bacteria might be responsible for the reduction of saltpetre to nitrite. More recent investigations have confirmed this view, and it is now considered that bacteria are essential for the reduction of saltpetre to nitrite both in pickle and in meat. Dr. M. Dixon and Dr. F. Bernheim‡ have shown that washed lean pork by itself does not reduce nitrates, and the British Food Manufacturers' Research Association§ have definitely proved that bacteria must be present in pickle before nitrite is formed from saltpetre. This is another point in favour of the use of old pickles. When a pickle is freshly made it is not a good medium for the growth of bacteria, and, consequently, the saltpetre is not changed into nitrite. As the pickle ages, it contains more and more diffusible substances from the meat, which forms an excellent medium for bacterial growth. As the result of bacterial action the saltpetre is gradually changed to nitrite.

A considerable amount of research work on the production of colour in bacon and ham has been carried out by the Research Laboratory of the Institute of American Meat Packers. They have shown that the colour of fully cured bacon and ham can be obtained more rapidly by using nitrite instead of saltpetre in pickle. The advantages are that the desired colour is produced with certainty and in less time than by the older saltpetre method, and the amount of nitrite required is only one tenth that of the saltpetre. The nitrite method has rapidly gained favour both in America and New Zealand, and in both countries legislation has been introduced permitting the use of definite small quantities of nitrite in place of saltpetre. But in Great Britain the use of nitrite in curing has not been legalised, and the present position is that its direct use contravenes our present regulations concerning the use of preservatives in food.

There is, however, a possible objection to the complete substitution of nitrite for saltpetre. It seems highly probable that the process of curing depends to a great extent on the maintenance of a suitable micro-flora. The use of nitrite instead of nitrate will, of course, alter the micro-flora, and it is possible that this alteration might have a deleterious effect on the character of the final product. In the case of hams, however, it is claimed that the use of nitrite has no effect on either flavour or palatability.‖

There is another important point in connection with the micro-flora. It seems probable that saltpetre plays a part in restraining the growth of anærobic bacteria, which might cause spoilage. It is therefore possible that spoilage due to anærobes may occur more frequently in nitrite-cured meats than in meats cured with saltpetre. This point requires further investigation.

(*Continued on page 224.*)

Extract of Meat: Some Notes on Commercial Production

By J. A. ROSEWARNE, B.Sc., A.I.C., *Chief Chemist, Messrs. Bovril, Ltd.*

In the preparation of all types of extract the most important factor is, undoubtedly, careful and intelligent scientific control. Much excellent material has been rendered useless by the adoption of haphazard methods and rule-of-thumb procedure. To secure a regular and first-class product nothing can be left to chance in making meat extract, or any other foodstuff.

POSSIBLY OWING to the somewhat restricted field of application of these meat products, a certain amount of misconception appears to exist as to their origin and preparation, if not their properties.

A fair range of experiments has been conducted, chiefly in the United States, with reference to questions of academic interest, but commercial aspects of preparation have received rather scanty attention, notwithstanding the costly nature of these materials, and the incentive so to improve manufacturing methods as to yield the highest grade of product.

This comparative inactivity on the part of meat works' chemists is due in some measure to the fact that the production of extract has to be largely subservient to the meat canning processes in use.

It should be pointed out in this connection that a meat works devoted solely to the production of extract, to the exclusion of preserved meats, would be unlikely to pay its way. Even in a works where extract is the principal product, provision has to be made for as much canning as possible, to ensure economical working. Of course, where the preparation of extracts of specific properties is demanded, the meat residues have to be regarded as by-products, whatever the cost.

It is gratifying, however, to find that it is possible

to produce very fine extract, while at the same time producing from the meat the highest standard of corned beef.

The method of production on these lines, as followed out in most of the meat works of South America and Australia, may be briefly outlined as follows:

The boned and dressed meat, packed in steel baskets, is immersed in scalding tanks of hot water, and remains for the period considered necessary for the part cooking which has to precede the hot pickling process. This brief immersion, of about twenty minutes' duration, in hot water, serves to remove only the most soluble extractives, amounting to about 1½ per cent. of the meat. Small though this amount is, insufficient to impoverish the meat, it contains all the properties most desirable in extract of meat. Much, however, depends on the subsequent treatment of these dilute soup liquors.

Further quantities of meat are scalded in the same tanks until the dissolved solids are brought up to a suitable point from which to commence evaporation.

The soup liquors are then filtered and fed to some form of vacuum evaporator, usually the triple effect type. In this type of evaporator the first stage is run at about five pounds steam pressure and seven inches vacuum, the second stage at about twelve inches vacuum, and the third at about twenty inches. The result of this treatment is to reduce the moisture from round about 95 per cent. to about 35 per cent.

The remainder of the concentration necessary to reduce the moisture to the final figure of about 18 per cent. is performed in finishing pans of the open, shallow, steam-jacketed type, preferably with agitators.

The evaporation in vacuum causes very little actual alteration of the character of the extractives, but the greater heat and access to oxygen occurring in the finishing pans bring about quite important changes in the composition of the extract.

Lack of heating renders the slowly evaporated product light in colour, and spongy in texture, without a full meaty flavour. The solubility of such a product is somewhat difficult.

On the other hand, excessive heating, with free access to air, causes objectionable results. In this way protein degradation products which are present in the solution may be even further broken down to

Overhead View, Meat Extract Cook Tank.

The Extract Department of the Bovril Factory in Argentina.

amino-acids or even ammonia, causing unpleasant flavours. Moreover, the total creatin content may be materially reduced by overheating at this stage, where normally the creatin would only be converted to creatinine. This conversion of creatin to creatinine is a useful index to the rate of heating in the finishing pans, other things being equal.

Generally speaking, overheating causes many complex changes in the nature of the extract, rendering it quite unsatisfactory.

Assuming that finishing has been properly carried out and all earlier stages well controlled, the result should be a paste, reddish brown in colour, with a strong meaty odour and taste. The product is usually run off into 56-pound containers and sealed off while hot. Well-made extract of this type, if soundly tinned, will keep almost indefinitely, although it is interesting to observe that during the course of time a reversion of creatinine to creatin takes place, about three years being necessary for the alteration of about 75 per cent. of the creatinine. This effect manifests itself sometimes in the appearance, in old extracts, of crystals of creatin these having come out of solution on formation from the more soluble creatinine. In the more solid extracts the development of such crystals is not very prominent, but if for any reason an extract is finished with a sufficiently high moisture to remain semi-fluid, this reversion to creatin causes the appearance of small nodular aggregates of crystals.

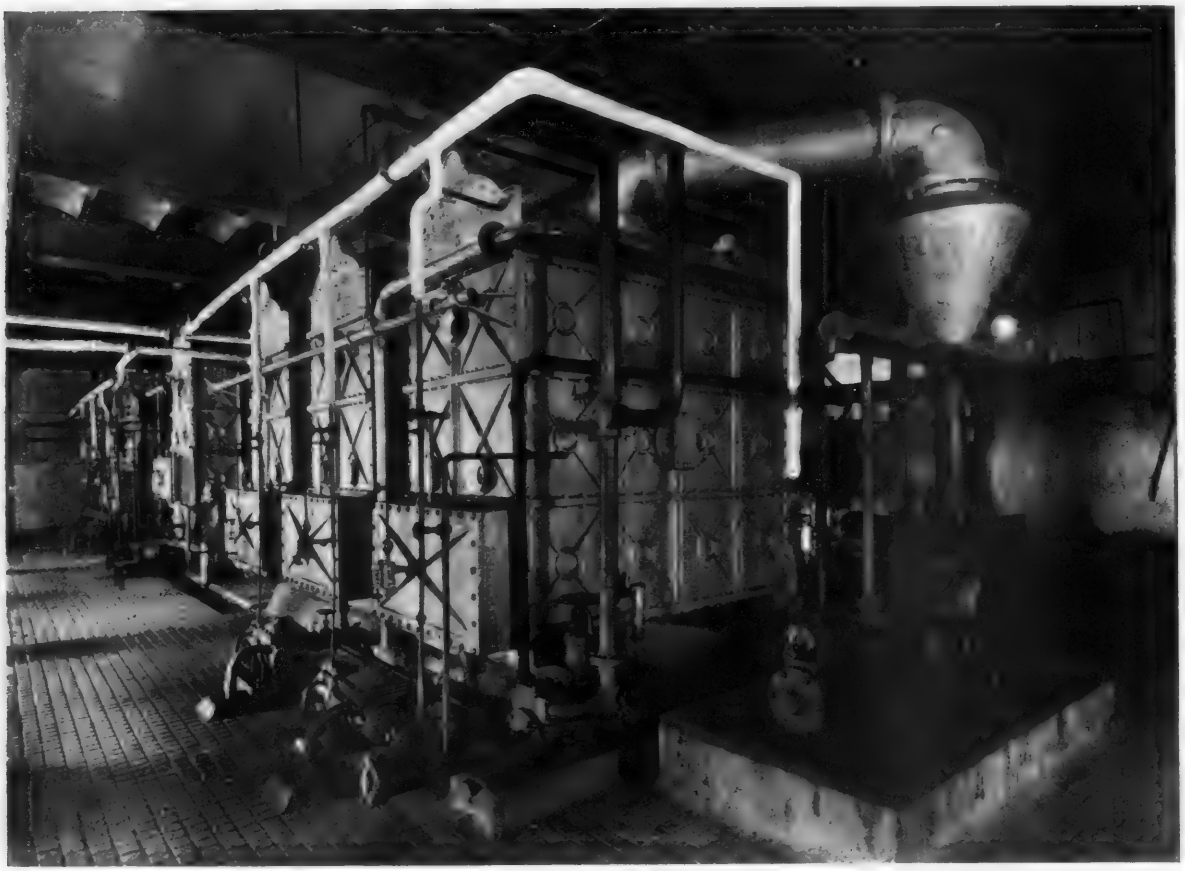
Such semi-fluid extracts, having about 25 per cent. moisture, are sometimes subject to another peculiarity. This is the separation of the gelatinous constituents in form of a spongy mass, leaving a clear fluid containing in solution nearly all the mineral salts and meat bases.

The occurrence of this phenomenon is of some importance in the packing of meat extracts, as the condition is sometimes taken to be some form of spoilage. This, however, is not so. Investigation has shown that no bacterial activity can be detected in these cases, and that the condition is brought about entirely by some slight change in the state of the gelatinous constituents. The process is normally a slow one, and it has been found very difficult either to accelerate or avoid it.

All the foregoing remarks with regard to the preparation of extracts from corned beef apply to extracts which are made as the sole product of the meat, except in the first stages. For instance, where meat is treated entirely for the extract, it is useless to apply the extraction water to lumps of flesh. The

Receiving Buckets Below Mincing Machines, and Conveyor to Extract Depot.

The Extract Department of the Bovril Factory in Argentina.



Battery of Soup Evaporators.

The Extract Department of the Bovril Factory in Argentina.

meat is therefore minced before placing in the extraction tanks, together with the requisite quantity of water.

The volume of water is kept down as much as possible in order to reduce evaporation costs later.

Steam heat is applied, the length of time of cooking and the cooking temperature being carefully controlled. Excessive heat at this stage causes the extraction of much gelatin from the meat, which is not desirable in a high grade product.

The presence of much gelatin, apart from considerations of quality, is undesirable as it causes some complications later—during evaporation.

A gelatinous extract, being more viscous, cannot be carried to the same degree of concentration in the vacuum evaporators as an extract of low gelatin content. And, further still, the finishing in open pans has to be done with much greater care, as the gelatin is somewhat susceptible to heat in the slightly acid extract medium, and easily breaks down to amino-acids, etc., long before the concentration may have reached the desired point.

After cooking, the soup is drawn off and filtered, and concentration is proceeded with in the same way as for corned beef extract. The residual meat, after drying, can be used as chicken food.

Extracts prepared in this way differ quite considerably from the corned beef extracts. The proportion of salts is lower, as is also the total creatin content. Soluble products of protein break-down—peptones and proteoses—are more in evidence, showing that, apart from the removal of the soluble portions of the meat, the extraction has had some action on the protein itself.

Extracts of this type very much resemble the domestic "beef tea," having a soupy, delicate flavour, more bland than the stronger, rather pungent flavour of the corned beef extracts.

Fish Meal

AN attempt is being made in Canada to find a way of profitably manufacturing a meal made from seaweed and fish offal. The seaweed is first dried, then ground and mixed with a certain percentage of the fish offal; subsequent operations are similar to those employed in making any fish meal. The particular reason for the incorporation of seaweed is because of its iodine content.

The Spoilage of Meat Foods

From the PICKETT-THOMSON RESEARCH LABORATORY

The following is a brief review of outstanding bacteriological work on the causes of the spoilage of meat foods.

AN ENORMOUS amount of research work has been done on the causes of the spoilage of various meat foods. The chief cause of this spoilage is the growth of bacteria and moulds. The bacteria bring about putrefactive changes which are always unpleasant but may not necessarily be very harmful. In other instances, however, dangerous and poisonous bacteria may be present, such as *Bacillus suipestifer, Bacillus paratyphosus, Bacillus enteritidis, Bacillus ærtrycke*, and *Bacillus botulinus*. These various bacteria are capable of causing severe outbreaks of food poisoning, in which many of the victims may die.

Thorough cooking of the meat before eating destroys the majority of these food poisoning bacteria, but *Bacillus botulinus*, being a spore-bearing organism, can withstand high temperatures, such as boiling. Since the above dangerous bacteria may be present in putrefying meat, it follows also that they may be present in all kinds of meat products, such as sausages, meat pastes, etc.

The following are some interesting abstracts from the various researches which have been carried out:

Spoilage due to Moulds.

Klein (1909) published a report on behalf of the Frozen Meat Trade Association on "The Nature of Black Spots on Chilled Beef." It appears that the beef shipped to this country from the Argentine occasionally develops circular black spots, which are present either isolated or in groups, on the lower or thin parts in the fascia, in the fatty portion of the thick parts, and in the fat belonging to the inner surface of the flanks. Klein found that these spots were due to a growth of a fungus which he called *Oidium carnis*. He concluded that this fungus was not harmful to human beings or to animals.

Bidault (1921) published a paper on the fungi of frozen meats. He found a variety of forms which were capable of growing at low temperatures of −10° C. and thereabouts.

Spoilage due to Putrefactive Bacteria.

Piettre (1913) states that the first stage in the putrefaction of meat is caused by a large ærobic, very motile bacterium of the proteus group. It produces an ammoniacal and hydrosulphide odour and a green coloration of the tissues, especially fatty tissues, mainly localised in superficial regions. The bacterium invades the tissues, especially the veins, during the period of cooling of the carcase, multiplying and distributing itself widely. It is desirable, therefore, to cool the meat as quickly as possible down to 15° C. to inhibit the development of bacteria. This rapid cooling, with or without ventilation, hastens muscular rigidity and prepares it for the refrigeration chamber.

Even greater care is required in the case of smaller animals, such as game and poultry, which are particularly liable to microbic invasion because of the relatively great extent of their cutaneous and intestinal surfaces, to the thickness of their muscles, and because game especially can rarely be cooled immediately after death. These, therefore, are more frequently tainted before being exposed to cold.

The drawing of poultry contaminates the abdominal walls and injures their preservation by cold, hence it would be advantageous to evacuate their intestines with a purgative before killing, as indeed, is done by workmen who are wont to give salt water to pigeons before killing them.

The sanitary inspection of meats before putting into cold storage is as important as the inspection on their removal from the cold storage.

Lefevre (1917) found that 60 per cent. of samples of Hamburger steaks gave bacterial counts of 10 million bacteria per gram, and 25 per cent. gave counts of over 50 million germs per gram. He states that lack of care and cleanliness is responsible for the high bacterial counts, the chief factor being the utilisation of meat kept too long under unfavourable conditions.

Weinzirl (1923) proposed that meat which contains 10 million bacteria per gram should be condemned.

Galippe (1918) made a bacteriological examination of meat coming fresh from the abattoir. He was able to cultivate bacteria in quantity from the depth of the muscular tissue within two or three hours of killing, and he gives reasons for believing that their presence is not due to down-growth from the surface of the meat after death.

The bacteria found were sometimes harmless, but sometimes they were of the disease-producing type. Similar organisms were found in frozen meat.

In another paper (1918), this author states that in spite of the care in preparing meat in the packing houses in the United States, France, and England, an abundant bacterial flora exists in the tissues of the meat, various kinds of cocci and spore-forming bacteria predominating. He found that refrigeration did not prevent enzymes from producing changes in the meat, and that bacteria were able to multiply to a considerable extent upon the surfaces of the meat.

Weinzirl (1928) states that "spoilage is a complex process. In the first place it is a souring of the meat, due to fermentation of the carbohydrates present, by ærobic, facultative, and anærobic bacteria; secondly, it is a digestion of the proteins by ærobes and facultative anærobes with abundant evolution of sulphides; thirdly, it is the production of indol, skatol,

and other vile-smelling compounds by ærobic, facultative and anærobic bacteria; and, fourthly, it is putrefaction with the production of sulphides by anærobes."

It is also well known that spoilage may be due to cell enzymes alone, such as autolysis. Certain types of spoilage in crabs, salmon, and sardines, which are autolytic rather than bacterial in nature, have been reported. Many of the putrefactive spoilage bacteria of meats produce ammonia, hydrogen sulphide, indol, etc., which can be detected by the smell. Some species, however, produce no such obvious effects, and, therefore, their presence cannot be detected by any casual observation. Unfortunately, many of the food poisoning bacteria produce no obvious changes, so their presence in the meat may be unsuspected.

Moran and Smith (1929) state that the practice in Britain of rapid cooling during the first twenty-four hours after slaughter is not usual, and many butchers object to it as detrimental. This prejudice was not shown to be scientifically sound, and cooling of the dressed carcase for one to two days at a temperature of 31° to 33° F. is advocated, followed by storage at 36° to 38° F.

Moran and Aitken (1929) investigated the two chief difficulties which occurred with chilled beef—*i.e.*, the prevention of mould and bacterial growth and the gradual appearance of an unpleasant or rancid flavour in the fat.

The control of the first is a question of the humidity of the air surrounding the meat. The second is more difficult to prevent and is the chief obstacle to the carriage of chilled meat from far distant countries. The carriage of frozen meat is much simpler, but there is definite permanent alteration, and beef, in particular, freezes badly. These authors discuss in some detail the influence of refrigeration upon the improvement of quality. Contrary to the opinions of butchers in Britain, the scientific evidence favours the view that refrigeration improves the quality, shown by a marked increase in tenderness with slight improvements in the juiciness and texture of the meat. If meat is to be so conditioned, he suggests (*a*) Cooling of the dressed carcase for one to two days at a temperature of 30° to 32° F.; (*b*) the further storage of the meat as sides or quarters at a temperature of 36° to 38° F. for ten to twelve days; (*c*) before its removal to the shops, storage of the meat for twenty-four hours at ordinary temperatures, or at some controlled temperature between 40° and 45° F.

The Souring of Hams.

Boyer (1926) found that hams from hog carcases direct from the killing floor forty-five minutes after slaughter, contained bacteria in the interior of the muscle, joint fluid, and bone marrow. Five species of anærobic organisms were isolated; four were tentatively identified as *Bacillus putrefaciens*, *Bacillus hystolyticus*, *Bacillus sporogenes* and *Bacillus tertius*. He also isolated a numerous and varied group of ærobic organisms, such as cocci, and bacilli, motile and non-motile. The absence of the *Bacillus coli* group of bacteria is pointed out as of special significance in eliminating the possibility that the organisms found in the interior of the hams gain access during the killing-floor operations, as bacteria of the *Bacillus coli* group were abundant and ubiquitous on the killing floor and were almost invariably found on the exposed surfaces of the carcases during killing-floor operations.

The bacteria responsible for the ham souring were disseminated throughout the carcase from the moment of slaughter, and quite possibly are present in the blood and tissues of the hogs during life. Prompt and efficient chilling and maintenance of low temperatures until sufficient salt has been taken up by the hams during cure to hold these organisms in permanent check are the only means indicated for the prevention of ham souring.

McBryde (1911) concluded that ham souring was due to *Bacillus putrefaciens*.

Reith (1926) made bacteriological investigations on hams before scalding, after scalding and before dehairing, and immediately after dehairing. All the samples were obtained within one hour after killing. Seventy-seven per cent. showed growth of bacteria under ærobic and 57 per cent. under anærobic conditions. He took similar samples of flesh and blood from living hogs, rabbits, and guinea-pigs, and found bacteria in all of the hogs by ærobic culture and in 56 per cent. by anærobic culture. The percentage was not quite so high in the case of living rabbits and guinea-pigs. These researches appear to show that bacteria are present in the muscle of the hogs even before they are killed.

Starvation of the hogs for thirty-six to forty-eight hours had no appreciable effect on the presence of bacteria in the blood or on the types of bacteria found.

Klein (1908) described a bacillus causing a taint in miscured hams. He called it *Bacillus fœdans*.

Spoilage of Sausages.

Magnuson (1918) investigated the development of slime formation on sausages. The appearance of the sausages was materially injured but the flavour was still good. He was unable to isolate the micro-organism which produced this condition.

The bacteria which cause spoilage of sausages are the same as those which produce spoilage of meat. It is important that the sausages should be prepared from fresh unspoiled meats, and in order to prevent the rapid growth of the bacteria which may be present in them, they should be kept at cool temperatures.

Conclusions regarding the Spoilage of Meat

Researches have shown that the spoilage of meat is caused chiefly by moulds and bacteria. The growth of moulds can be largely prevented by keeping down the humidity of the air in which the beef is stored. The moulds come from the air. They do not originate in the beef itself.

The bacteriological problem of meat spoilage is much more difficult. Researches have shown that bacteria are present in the blood and flesh of the animal even before it is killed. These bacteria come chiefly from the intestines of the animals.

(*Continued on page 237.*)

Recent Developments in the Sealing of Tin Cans under Vacuum

The following is a brief description of an installation which has recently been developed for the sealing under vacuum of tin cans for foods and other products. A set of these machines is now being operated with remarkable success in one of the largest packing factories in this country. A few days ago we had the privilege of seeing the machines in operation.

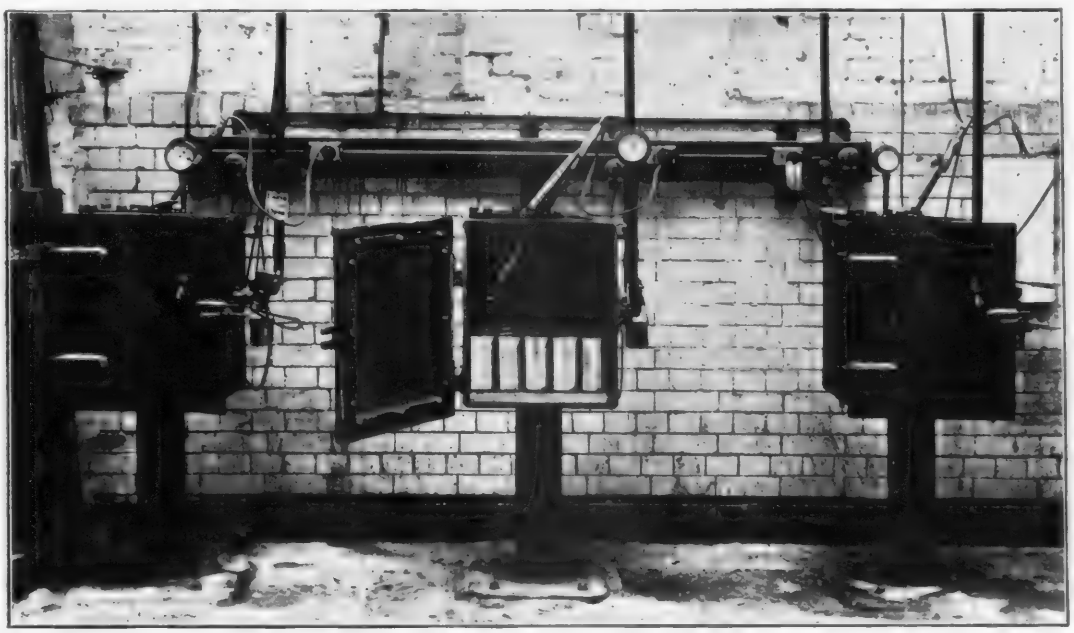


FIG. 1.

THE ACCOMPANYING photographs give a good idea of the main features of this new type of vacuum sealing machine. Fig. 1 shows a battery of three machines connected to a vacuum line. Each machine consists of a chamber supported on a pillar and fitted with a door in front, and, on top, an observation window and an electrically heated soldering iron. The interior of the chamber is illuminated by an electric light. The soldering iron is carried on a universal bearing so that it can reach any part of the chamber.

The tins to be sealed are loaded up on a tray and placed in the chamber (see Fig. 2). The door is closed and any vacuum up to 28 to 29 ins. is drawn within one minute. The operator then manipulates the soldering iron (see Fig. 3) and seals the cans one after another, then breaks the vacuum and removes the tray. These operations are carried out with remarkable speed and facility, as many as thirty to forty operations being possible in one hour. For example, a tray takes 30 tins of 2½ inches diameter, and we found by timing the operator that tins of this size were being sealed at the rate of 1,000 to 1,110 an hour. Three machines were used, and the operator was kept fully occupied, soldering in one machine whilst the others were being loaded and unloaded.

The machine is not limited to any particular size or shape of can. It is simple in design and operation, and its first cost and cost of upkeep are exceedingly low. It occupies only about 5 square feet of floor space. Moreover, the volume of air to be evacuated per tin loaded is small in this machine as compared

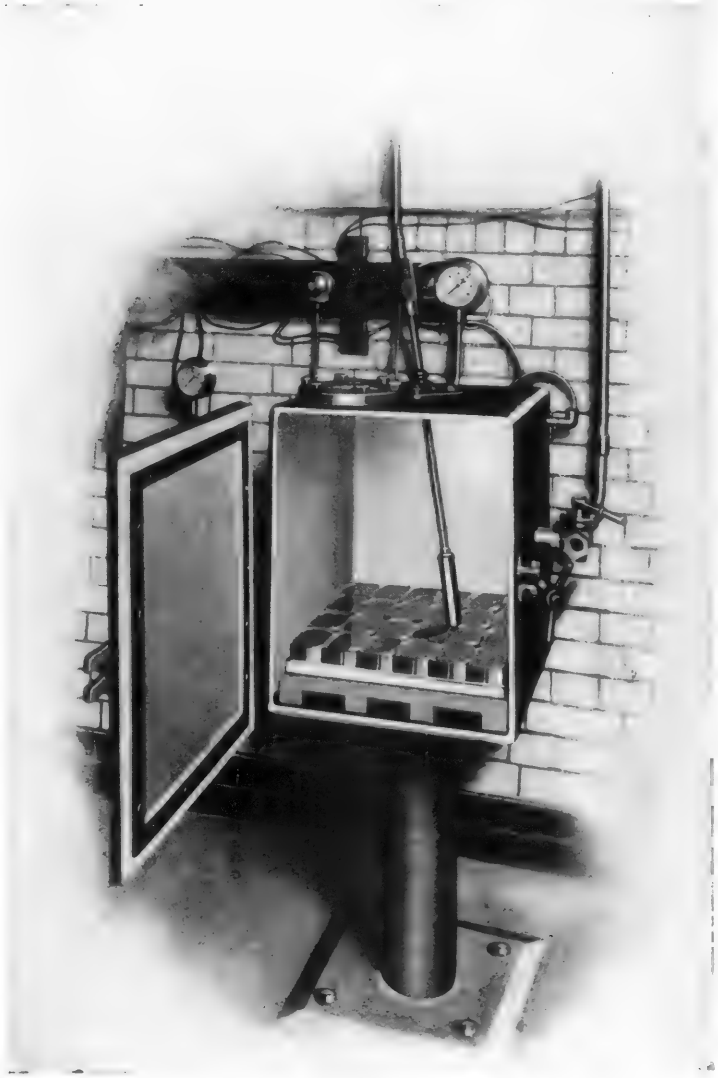


FIG. 2.

FIG. 3.

with the rotary type, hence the high speed of operation attained; the rotary type cannot compete with this machine. Finally, the range of materials that can be handled is very comprehensive, including meat and fish products, fruits, vegetables, milk, soups, confectionery, biscuits, cakes, and tobaccos, cigarettes, cereals, jams, chemical products, etc.

New Companies

ACCORDING to the Semi-Annual Statistical Report relating to new companies registered in England during the half-year ended June 30, 1930, a total of 325 food companies, with a total capital of £3,778,810, were registered. Of these, four were public companies, having a capital of £217,500, and 321 were private companies, with a capital of £3,561,310. The Associated Canners, Ltd., has a capital of £1,650,000. This report was issued by Jordan and Sons, Ltd., of London.

Duck-Meat

JOHN M. KENNEDY tells us that the Italian Government recently announced a programme for financing a company to engage in the raising of poultry, particularly ducks, to provide a substitute of duck-meat in place of fresh and frozen meats as one of the components in the Italian Army ration. Land will be purchased or leased in Northern Italy, and further details concerning this new enterprise will probably be known later.

Enquiries

117. Required names and addresses of firms in this country who specialise in the sale of citron rind in pickle.

118. Required recipes for effervescent lemon powder. What substance is used for giving a permanent foam?

119. Wanted formulæ for lemon cheese.

120. Names of manufacturers of plant for all stages in the production of Potato Crisps required.

121. Names of firms making Dry Ice, also those making cartons and containers, wanted.

122. We should be glad to have recipes for Lemon Cheese not involving use of starch or flour.

REPLY TO ENQUIRY NO. 123.—*Can you supply us with a formula for Ice-Cream Powder suitable for cold process?*

The enquirer does not state whether (*a*) he purposes making and marketing a cold mix ice-cream powder as a commercial proposition, or (*b*) simply desires to make up a stock of this solely to supply his own ice-cream needs. The following data, it is hoped, will be useful in either case.

Most of the ice-cream powders now on the market make a "custard ice" and require boiling. Such preparations consist principally of cornflour, or a similar farinaceous base, plus some sugar, and flavouring, usually vanilla. They may, or may not, also contain one or more of the following: powdered egg yolk, gelatin, or a gum. The "custard ice" made from this type of powder has not a balanced or significant food value, and it is presumed such a product is not what is required (and is most certainly not advocated) for the following additional reasons:

1. The market is already well supplied with such preparations.

2. There is a rapidly growing body of opinion in influential circles, both inside, and external to, the trade (amongst medical officers of health, sanitarians, and the like) in favour of the establishment of legal definitions and requirements respecting ice-cream, and such legislation, when it comes, will (and quite rightly) unfavourably affect those unbalanced products which now masquerade as ice-cream. (*Cf.* Dutch, American, etc., legislation.)

3. There are now available on the market, liquid, ready compounded, well-balanced, genuine ice-cream mixes which require freezing only, and this product is available from reputable firms and is shipped all over the country. Also a similar product which has, in addition, been sterilised, and therefore has a considerable keeping quality factor; and, in addition, at least one powder of dairy origin, free from cornflour, etc., which one has not yet had the opportunity of analysing, but which should yield an ice-cream of genuine quality.

The preparation of a powder which will produce a satisfactory genuine ice-cream in the cold way is not easy. We should suggest, if such were contemplated, something like the following procedure be adopted.

A powder of the following composition be compounded:

Finely powdered sugar	40 ozs.
Skim milk powder (preferably "spray process")	30 ozs.
Fine quality powdered gelatin	10 ozs.
Vanillin	1 oz.

The first three ingredients could be sieved to mix, then the vanillin either (*a*) triturated with increasing quantities of the other mixed ingredients to incorporate, or (*b*) dissolved in rectified spirit and sprayed on (costly!). Then, if milk (3 quarts), 25 per cent. cream (1 quart), sugar (1¼ lbs.), be taken and 8 ozs. of the powder dissolved and dispersed, with the aid of a little heat in, say, one pint of the milk and then added to the bulk, and the whole stirred until dissolved and mixed, we have a resulting cold mix capable of standing 80 to 90 per cent. overrun, of good palatable quality, and, moreover, an analysis approximately as follows: Fat, 7 to 8 per cent.; M.S.N.F., 10 per cent.; sugar, 12·5 per cent.; gelatin, 0·6 per cent.; total solids, 31.0 per cent. It should be noted that such a "cold mix" (or, for that matter, any cold mix other than the liquid, ready compounded mixes previously mentioned) suffers the bacteriological disadvantage of lack of pasteurisation.

What the commercial future of such a preparation as outlined above would be were such a project entertained, one hesitates to prophesy; anyhow, if the enquirer cares to elaborate his requirements we will endeavour to supply him with the desired advice.

E. H.

124. Can you supply name of firm making the "Netur" closing cap for jam jars?

REPLY TO ENQUIRY NO. 104.—*Further suggestions relating to the prevention of mould on Lemon Curd are as follows.*

Mould formation on your Lemon Curd is the result of slight variations in temperature. This causes evaporation of the moisture content, which condenses again as the temperature falls. The mould occurs always in air pockets or in tightly closed vessels where the moisture can accumulate. The small amount of condensation which results weakens the surface solutions and renders the conditions ideal for mould formation. It is probable that the solid

content of your Lemon Curd is not sufficient to counteract this reaction. The total solids in your product should exceed 70 per cent. for long keeping, and if this is not the case there is always the possibility of mould formation.

The obvious remedy for your trouble is the following:

1. Allow the curd to cool before covering.
2. Use a porous paper for covering.
3. Do not attempt to seal tightly with metal cap.

The best wash for the walls is Deodorol. This preparation can be mixed with the lime when the walls are washed, or it may be dissolved in water (one in a hundred), and sprayed over the factories. This treatment will keep open the mould spores, but will not entirely remove the difficulty that you have experienced. Some manufacturers burn sulphur in their works during the night and this is comparatively effective.

REPLY TO ENQUIRY NO. 112.—*The following additional remarks refer to the prevention of cracking in Lemon Curd.*

The cracking of Lemon Curd is very frequent and is almost invariably caused by a shortage of Gluten or Albumen in the product.

Most manufacturers make the mistake of using high grade flour in order to ensure a better colour. This generally results in a shortage of gluten, and it is better to use an ordinary household flour or select a product which is highly glutinous. It is possible to get over the difficulty by adding a quantity of Egg Albumen or by using a cheaper flour.

The second cause of cracking frequently arises from the colour employed. The best preparation is Tartrazine, which should be entirely neutral. Acid Tartrazines introduce mineral acids into the products which invariably give trouble.

Correspondence

To the Editor.

DEAR SIR,

May I draw your attention to a slight misprint in the July issue of FOOD MANUFACTURE? On page 201, under the heading of "Canned Foods," you have printed portions from the paper which I gave to the Plymouth Rotary Club in October, 1929. In the final sentence the quotation from the Ministry of Health report which reads "glass jars were not regarded as objectionable" in your issue, should read "glass *fragments* were not regarded as objectionable." The Ministry stated that these fragments were too small to cause any damage, but as some samples of jams have been found to contain particles as large as $\frac{3}{32}$ by $\frac{3}{16}$ inch, I venture to query their statement.

Yours faithfully,

CYRIL E. GILL.

A New Book on the Packing Industry

The Packing Industry. A Series of Lectures. Issued by the University of Chicago Press. 1930. Cloth, illus., pp. xv-357, price 13s. 6d.

Mr. Leon C. Marshall, the Dean of the School of Commerce, is at pains, in his preface, to point out that this series of lectures does not consist of specialised presentations, but rather of a bird's-eye survey of a broad subject containing some material not before correlated in convenient form. Their outcome has been the organisation of the Institute of Meat Packing.

The assistance given by the Department of Agriculture in the improving of stock, fighting of disease, reporting conditions, and studying costs of production are dealt with by the secretary of the department, and another lecture gives the history of the packing industry during the past seventy-five years. Similarly, the plant and equipment from the days before the Civil War down to the present are described by Mr. Cushman. In discussing the operations on beef and mutton, it is interesting to note that the loss in weight of the beasts between the feeding place and the slaughter yards runs from 4 to 9 per cent. From the point of view of humanity and to improve the killing-condition, the animals are fed shortly before killing; dealing, as they do, with such enormous numbers, this constitutes serious expense, which may be regarded as practically all waste. Incidentally, it is noteworthy that mutton does not figure in the lectures as such—it is all lamb.

It is in the hog that American meat interests take the greatest pride, and on the subject Mr. Oscar G. Mayer grows almost lyrical: "Pork-packing is," he says, "uniquely an American industry. It is the product of American brains and energy, built without much precedent from Europe. The American pork packer . . . has rendered a service which the public is just beginning to recognise. He has built the vast organisation, and supplied the marvellous and original technique by which these highly perishable products are distributed in fabulous volume, over land and sea, into every corner of the globe."

The very complicated matter of financing so large an industry is dealt with at considerable length by E. A. Cudahy, Jr. In the lecture on Science in the Packing Industry, Mr. W. D. Richardson, introducing the subject, is careful to credit T. A. Edison with the development and not the invention of the resistance filament lamp. This side of the industry makes exceedingly interesting reading in showing how it was the by-products that were the means of introducing the reign of science to the industry as a whole. The traditions connected with refrigeration and curing are among those that have been swept away by scientific control of the packing house until, it

is claimed, there is now only a negligible quantity of waste and spoilage. Whilst sympathising in the main with this, it is still necessary to keep an open mind upon such problems which up to now defy scientific explanation but concerning which tradition has well-founded ideas. On the subject of vitamins, the lecturer has much to say of an unilluminating character. It is of importance to note that of the cost of the laboratories no less than 55 per cent. is spent upon research.

Taken as a whole, there is much of considerable value to meat packers in any part of the world, and the value of the book would have been greatly enhanced had it been supplied with an index.

(*Continued from page 232.*)

As soon as the animal is killed, any bacteria present in the flesh begin to multiply rapidly. This multiplication is inhibited by cold. It is important, therefore, to chill the carcases immediately after the killing, so as never to give the bacteria a chance of multiplying. Great cleanliness should be exercised at all stages. The carcases must not be allowed to lie about on dirty floors, and more especially all contamination with fæcal matter should be avoided.

The greater the cold the less can bacteria grow, although it does not kill them. The disadvantage of very low temperatures which freeze the beef is that it causes physical changes in the meat. When frozen beef is thawed it seems to be more susceptible to rapid decomposition. The next most important method of preventing the spoilage of meat is by heating, as employed in the canning of meat foods. Moulds and the majority of bacteria are easily killed by boiling. There is a certain class of bacteria present in meat, however, which can resist temperatures as high as boiling-point. These are the spore-bearing bacteria, and they come from the fæcal matter of the animals. The majority of the sporing bacteria are harmless to man, except *Bacillus botulinus*, which causes a fatal type of food poisoning. The harmless sporing bacilli are usually capable of producing putrefaction with offensive smells. It is essential, therefore, in the canning of meats to exclude these organisms as much as possible, and this can only be done by scrupulous cleanliness and washing, more especially with regard to the removal of the fæcal matter. The cans must also be thoroughly clean. In order to insure that the sporing bacilli may be killed in the canning process, the can containing the meat must be heated to a high temperature, about 250° F., for a sufficient length of time. The time required varies according to the size of the cans, as the heat takes some time to penetrate into the interior of the large cans. All efficient canning factories have self-recording thermo-regulators, which ensure that the vessels containing the meat products have been heated to a sufficient temperature for a sufficient length of time.

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Fish Preserving

SEA products are peculiarly perishable. Buoyed up by the medium in which they live, they do not require tough skins, membranes, or ligaments, and are, therefore, physically delicate and more easily invaded by bacteria than land animals. The slime with which fish are usually covered also forms a favourable medium for bacterial growth.

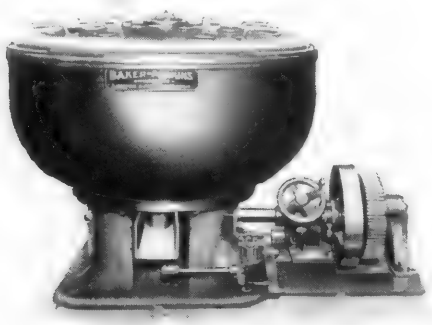
Low temperature preservation has been found to be the most suitable for fish. Destructive processes, such as bacterial decay and autolysis, are retarded by moderately low temperatures and arrested below freezing-point. Artificial refrigeration can be accurately controlled and easily withdrawn when the fish are to be used. Difficulties due to discoloration and loss of tissue-juices have now been overcome, these having been traced to certain physiological processes in the living fish.

A recent advance in the Fish Preserving Industry has been the introduction of electrically operated refrigerator railway waggons.

Trade News

The "Velvos" Chocolate-Making Machine.

Messrs. Baker Perkins, Ltd., have produced an extremely important leaflet giving particulars of their new "Velvos" Chocolate-Making Machine. It is not too much to say that this machine is revolutionary in character and design. It is claimed that the "Velvos" machine grinds whilst it conches and possesses certain important advantages over the conche machine. It has proved remarkably successful in the making of coatings and of fondant or milk chocolate.



The machine consists of a water-jacketed hemispherical body mounted on a heavy cast-iron base. Inside the top of the hemisphere is mounted a vertical ring made of extremely hard, perforated grinding plates. Inside this ring, and revolving on a vertical axis, is a rotor which carries the grinding segments. These are equally hard, but are of the grid type, and are arranged to swivel so that the pressure due to centrifugal force can be wholly or partially neutralised by the adjustment of a small weight on each.

This rotor is driven through a vertical shaft, and very accurately cut gears carried in the base. On this shaft runs a vertical worm and also a slow-running sleeve, which causes a scraper to revolve round the inner surface of the hemisphere.

A charge of about 1,000 pounds of chocolate is run in at the top, and when the machine starts up the central worm forces the chocolate downwards, up the sides of the hemisphere, and inwards through the holes in the grinding ring. Here it is caught by the rotating grids and subjected to the necessary rubbing action, after which it flows down into the worm chamber and is again forced round the circuit.

When the treatment of the batch is complete, the chocolate is run out through the piston type outlet valve.

On the main driving shaft is a robust friction clutch suitable for working inside a single pulley for belt drive, or inside a chain wheel driven from an electric motor. All the main bearings are of the ball or roller type, and the driving gears in the base are automatically lubricated.

The outside of the pan is machined and polished, and the general design makes it a very simple matter to keep the machine clean. The jacket is provided with steam and water coils for controlling the temperature.

When desired, an automatic temperature regulator can also be provided which makes it possible to run the machine for long periods with very little attention. At no time is a skilled operator needed.

It will be seen from the above description that the outstanding novelty in principle and design is the pumping of the chocolate through the grinding members. By this fundamental invention fresh surfaces of chocolate are constantly presented to the grinding-shoes and to the air, with noteworthy results.

* * *

New Plant Installations.

The Wigston Co-operative Society, Ltd., are installing a model dairy. The whole of the refrigerating plant and dairy equipment is being supplied and installed by York Shipley, Ltd., London. This firm have carried out in the past few years over forty installations for dairy and butchery plant in the Co-op. movement, and have recently completed erection of plant for the Blackpool and Eccles societies. The new Wigston plant is modelled on the same lines as the Market Harborough Society's plant, which was installed some eighteen months ago by the same firm and has proved so satisfactory.

The Express Dairy Co., Ltd., have recently placed an order with Messrs. York Shipley, Ltd., for complete refrigerating plant to be used in connection with air conditioning equipment also manufactured and supplied by them at the new Cricklewood depôt. In the past, York Shipley have supplied and installed some twelve plants to this large milk-distributing firm—a good recommendation for their reliability and efficiency.

* * *

National Mark Canned Fruit and Vegetables Scheme.

According to the first list issued by the Ministry of Agriculture and Fisheries, the following firms have been authorised by the National Mark Committee to apply the National Mark to cans of fruit, peas, and beans grown and canned in England and Wales: *London*—Kearley and Tonge, Ltd., Mitre Square, E.C. 3. *Cambridge*—Wisbech Produce Canners, Ltd., Lynn Road, Wisbech. *Hants*—The Hampshire Preserving Co., Romsey. *Hereford*—Herefordshire Fruit Co., Ltd., Mansion House, Hereford. *Surrey*—J. E. Austin and Co., Ltd., St. James's Works, Cromwell Road, Kingston-on-Thames. *Warwick*—Greenwood, Paige and Co., Ltd., Seville Works, Tyburn, near Birmingham. *Worcester*—Vale of Evesham Fruit Canners, Ltd., Badsey, near Evesham. Supplementary lists will be issued at short intervals.

* * *

Bee Supplies.

Those requiring information on complete equipment, including hives and honey extractors, for bee-keeping and honey production will find it in an illustrated booklet issued by J. T. Burgess and Son, of Exeter.

* * *

Temperature Regulators and Valves.

The Drayton Regulator and Instrument Co., Ltd., have issued leaflets describing their "Simplex" Temperature Regulator, Automatic Mixing Valves, and Packless Radiator Valve.

* * *

Visit to B.T.H. Works.

On June 14 members of the Physical Society paid a visit to the Rugby Works of the British Thomson-Houston Co., Ltd.

* * *

Extension of Premises.

Messrs. Joseph Travers and Sons, Ltd., Covent Garden, have recently extended their premises.

* * *

"The Morton News."

Our congratulations to Mr. F. E. Robson for the attractive design of a folder entitled *The Morton News*, issued by C. and E. Morton, Ltd., London. This particular issue is devoted to fruits and biscuits. The general lay-out of this folder is a work of art.

* * *

Inventions Exhibition.

The International Exhibition of Inventions will take place from October 1 to 11 (inclusive) at the Central Hall, Westminster, London.

Meat Mincing Machine.

The accompanying illustration is a photograph of the Dayton Safety Electric Meat Mincer for sausage making, meat mincing, and suet shredding. Special features are the safety feed-pan, the ball bearing, and the air-cooled motors with small reduction gears. The machine is of simple construction. There is only one place to oil, and ball bearings require vaseline only once a year. Up to 750 lbs per hour is the chopping capacity of the 1-h.p. models; there are also ½ and ⅓ h.p. machines for lower capacities.

* * *

Confectioners' and Bakers' Exhibition, 1931.

We understand that a number of firms are making inquiries with regard to space in the above exhibition. We have been asked to notify all those firms who might be thinking of making inquiries that nothing can be done until after the close of the forthcoming exhibition. All exhibitors in that exhibition have the first refusal of the space they occupy, and particulars of available spaces for 1931 will not be known until probably November or December of this year.

* * *

School Shield for Empire Bread.

On account of the satisfactory response to a preliminary inquiry, the directors of the Trades Markets and Exhibitions, Limited, have resolved to present a handsome silver shield, measuring about 33 inches by 26 inches, for competition amongst the bakery classes of technical schools at the International Trade Exhibition held annually in September within the Royal Agricultural Hall, London.

The competition will be open to teams of two students, each selected by the authorities of the respective schools. Each school will only be allowed one team. The shield will be held by the winning school for one year. The successful students will be presented with medallions. Entry fee, 5s. per team. Third-class travelling fares will be refunded.

The teams will be supplied with suitable quantities of Empire products, including fourteen pounds of flour, with salt, yeast, and malt extract or other equivalent improver, and will be required to select from their batches for judging one tin loaf (upright) and one pan Coburg loaf, each of about two pounds in weight.

* * *

Cup for Currant Bread (to be won outright).

The same teams may also enter a competition for the best two one-pound loaves of currant bread for a silver cup of the value of eight guineas offered by the Committee of the Central Currant Office. This trophy will be won outright, and will be retained by the school sending the successful team, while the members of the team will be presented with medals.

* * *

Conditions.

A working bakery will be erected within the Gilbey Hall section of the exhibition buildings.

Teams must attend on the day and at the hour arranged, of which they will receive due notification.

Teams must be composed of students who are not more than 21 years of age on September 1, 1930.

The students must have been enrolled at the school they represent during the previous session—1929-30.

The bread produced will be judged in accordance with the conditions applicable to the commercial classes laid down in the Official Schedule of the exhibition.

The first competition will take place on the following days: Monday, Tuesday, Wednesday, and Thursday, September 8, 9, 10, and 11, 1930.

Entries must be sent to H. S. Rogers, 11, Queen Victoria Street, London, E.C. 4, not later than Wednesday, August 20.

* * *

Judges in the Bread Section.

The following gentlemen have consented to act in the capacity of judge at the exhibition, which is to take place this year at the Royal Agricultural Hall, London, from September 6 to 12: Messrs. P. H. Moll, London (Chairman); A. J. Clark, Hove (Vice-Chairman); E. Harding, Birmingham (Arbiter); H. Bamford, London; E. C. Bell, Sheffield; F. Broomfield, Croydon; H. Calam, Huddersfield; E. Coleman, J.P., Margate; W. Collier, J.P., Leigh, Lancs; B. Fisher, Liverpool; F. G. Hill, Richmond; J. C. M. Kerslake, London; J. H. Merrett, Cardiff; H. Ogden, Brighton; W. H. Palmer, Swansea; B. Pooley, Plymouth; W. Purdy, Gt. Yarmouth; H. A. Sapsford, Highams Park; A. Sargeant, London; B. Smith, Weymouth; H. Warburton, Bolton; E. H. Wright, Wallasey; and W. H. Wigley, Derby.

Bakers and confectioners who intend to compete at the London Exhibition, if they are members of a recognised bakers' association, should have received a copy of the Official Schedule. Any member of the trade who desires a schedule but has not received one, and who is a member of any association, should apply to his secretary, but anyone who is not a member of an association should apply to H. S. Rogers, 11, Queen Victoria Street, London, E.C. 4, when one will be sent post free. Secretaries of associations requiring a supply are advised to communicate with Mr. Rogers.

* * *

British Industries' Fair.

The Department of Overseas Trade announces that the British Industries' Fair, 1931, will open in London and Birmingham as usual on the third Monday in February (the 16th) and will close on Friday, February 27.

In a letter to manufacturers the Comptroller-General, Department of Overseas Trade, Sir Edward Crowe, writes:

> "The London section of the fair, which, as you are no doubt aware, is organised by this department, will again be held at Olympia, where all the buildings, including the whole of the Empire Hall, will be available for the first time.
>
> "His Majesty's Government have again made a grant of £25,000 for advertising the fair, and the services of the Trade Commissioners, the Commercial Diplomatic Officers, and the Consular Service will be available for making the fair known to trade buyers in all parts of the world.
>
> "In view of the success of the last fair, it is anticipated that all the available space will be taken up at an early date, and, consequently, no guarantee can be given that space will be available in respect of applications received later than July 31, 1930."

By the addition of two floors of the Empire Hall, Olympia, which were not available last February, the exhibiting area of the buildings is increased by 50,000 square feet to a total of 300,000 square feet.

Following a recommendation by the exhibitors' advisory committee, it is announced in the official regulations that the fair in London will open and close half an hour earlier than in previous years. That is to say, the hours will be 9.30 a.m. to 7.30 p.m., and the public, instead of being admitted from 4 p.m. to 8 p.m., will be admitted only from 4.30 p.m. to 7.30 p.m., and from 1 p.m. to 7.30 p.m. on Saturday, February 21.

New Companies

SUNFIELDS, LIMITED. (248182.) 24 Russell Chambers, Covent Garden Market, W.C. 2. To carry on the bus. of wholesale and retail greengrocers and fruiterers, etc. Nom. Cap.: £1,000 in £1 shares.

HEWETT FISHING COMPANY, LIMITED. (248246.) 1, Cross Lane, E.C. To carry on the bus. of steamship owners, fishers, etc. Nom. Cap.: £5,000 in £1 shares.

CHARLES BYRD AND SONS, LIMITED. (248478.) Coopers Lane, Evesham, Worcs. To take over the bus. cd. on at Evesham as "Charles Byrd and Sons" and to carry on the bus. of cider and perry mnfrs., restaurant keepers, etc. Nom. Cap.: £3,000 in £1 shares (2,000 pref. and 1,000 ord.).

"TOMUSTO" (1930), LIMITED. (248471.) 1, Albemarle Street, W. 1. To acquire the trade mark "Tomusto" and to carry on the bus. of biscuit, cheese, and pastry mnfrs. and dlrs., etc. Nom. Cap.: £10,000 in 5,000 pref. shares of £1 and 20,000 ord. shares of 5s. each.

M. BLOOM'S, LIMITED. (248563.) 259a, Tottenham Court Road, W. To carry on the bus. of mnfrs. of and dlrs. in optical glasses. Nom. Cap.: £100 in £1 shares.

RICHARD FLEWITT AND COMPANY, LIMITED. (248498.) Smithfield Market, Manchester. To take over the bus. of fruit and vegetable salesmen, etc., cd. on at Manchester by W. J. and W. G. Flewitt. Nom. Cap.: £5,000 in £1 shares.

SAMPSON AND BARLOW, LIMITED. (248543.) 135, Victoria Road, New Brighton. To take over the bus. of wholesale and retail butchers and meat salesmen cd. on at Birkenhead and New Brighton as "Sampson and Barlow." Nom. Cap.: £1,500 in £1 shares.

E. LAWS AND COMPANY, LIMITED. (248794.) 142-144, Minories, E.C. 3. To take over the bus. of grocers and provision mchts. cd. on at Minories, E.C., and at Praed Street, W., and Beckenham, by E. Laws and Co. Nom. Cap.: £10,000 in £1 shares.

H. P. DAVIES AND COMPANY, LIMITED. (248559.) 53, Lord Street, Liverpool. To carry on the bus. of wholesale and retail provision mchts., etc. Nom. Cap.: £1,500 in £1 shares.

W. A. MABLEY, LIMITED. (248720.) 35, High Street, Bromyard, Hereford. To carry on the bus. of butchers, etc. Nom. Cap.: £700 in £1 shares.

H. S. SHIPTON AND SONS, LIMITED. (248820.) Seething House, 10, Byward Street, E.C. 3. To take over the bus. of corn and grain mchts. and factors cd. on by H. S. Shipton and Sons. Nom. Cap.: £50,000 in £1 shares.

CHICORY, LIMITED. (248661.) "Newlands," St. Ives, Hunts. To carry on the bus. of growers, mnfrs., and dryers of chicory, etc. Nom. Cap.: £6,000 in £1 shares.

F. SHEARING AND CO., LIMITED. (248692.) 75, Mark Lane, E.C. To carry on the bus. of mnfrs. of and dlrs. in corn, hay, straw, flour, and grains, etc. Nom. Cap.: £2,000 in £1 shares.

BIRKETT AND BOSTOCK, LIMITED. (248658.) Coronation Bakery, Swallow Street, Stockport. To carry on the bus. of wholesale and retail bakers, etc. Nom. Cap.: £10,000 in £1 shares.

THOMAS COUPE AND CO., LIMITED. (248980.) To take over the bus. of a tea mcht., importer, and blender cd. on at 29, Ainsworth Street, Blackburn, as "Thomas Coupe and Co.," and at 10, Fleming Square, Blackburn, as "James Kenyon." Nom. Cap.: £5,000 in £1 shares.

SUNSHINE TABLE WATERS, LIMITED. (249057.) West Moor, Killingworth, Northumberland. To enter into an agmt. for the acquisition of the bus. of aerated and mineral water mnfrs. cd. on at West Moor, Northumberland, by W. G. Whitfield. Nom. Cap.: £1,000 in £1 shares.

TUBBY ISAACS, LIMITED. (249059.) 1, Scarborough Street, Whitechapel, E. 1. To carry on the bus. of fishers, fish salesmen, etc. Nom. Cap.: £100 in £1 shares.

P. J. LACY, LIMITED. (248945.) 2, Orleans Road, Old Swan, Liverpool. To take over the bus. of a baker and confectioner cd. on at 555, Prescot Road, and 132, Derby Lane, Liverpool, as "G. A. Stevens." Nom. Cap.: £800 in £1 shares.

G. CHAMBERLAIN AND SONS, LIMITED. (248924.) To take over the bus. of mnfg. and wholesale confectioners and tobacconists cd. on at 123, Stapleton Road, Bristol, and elsewhere, as the "Royal Confectionery Co." Nom. Cap.: £2,000 in £1 shares.

FERGUSON AND NEARY, LIMITED. (249030.) 21, Drake Street, Stretford Road, Hulme, Manchester. To take over the bus. of blenders and dlrs. in edible oils and edible oil products, etc., cd. on at Manchester as "Ferguson and Neary." Nom. Cap.: £7,000 in £1 shares.

G. W. PEASGOOD, LIMITED. (249000.) To take over the bus. of a wholesale and retail grocer and provision mcht., etc., cd. on at High Street, Oakham, Rutland, by G. W. Peasgood. Nom. Cap.: £3,000 in £1 shares.

BEDDINGTON NUT COMPANY, LIMITED. (248916.) 11, St. Mary at Hill, E.C. 3. To carry on the bus. of producers, mnfrs., and retail dlrs. in nut foods, biscuits, etc. Nom. Cap.: £2,000 in £1 shares.

MACGEORGE AND JARDINE, LIMITED. (249066.) 10-18, Victoria Street, Liverpool. To take over the bus. of brokers, mchts., and importers of fruit and other produce cd. on at Liverpool as "MacGeorge and Jardine." Nom. Cap.: £20,000 in £1 shares.

ARROW TEA COMPANY, LIMITED. (249040.) 15, George Street, E.C. 4. To carry on the bus. of mnfrs. of and dlrs. in tea, coffee, cocoa, and other food beverages, etc. Nom. Cap.: £100 in £1 shares.

LEGGS (WEST BROMWICH), LIMITED. (248932.) To take over the bus. of bakers and confectioners cd. on at High Street, West Bromwich, and at Bearwood, Smethwick, Staffs., as "Legg Brothers." Nom. Cap.: £1,000 in £1 shares (250 pref. and 750 ord.).

HEALTH TEA COMPANY, LIMITED. (248898.) 18, Farmcote Road, Lee, S.E. 12. To carry on the bus. of wholesale and retail importers, exporters, and dlrs. in tea, coffee, etc. Nom. Cap.: £100 in £1 shares.

HARDEN'S STORES (WILLESDEN), LIMITED. (248927.) 130, High Road, Willesden Green, N.W. 2. To carry on the bus. of provision mchts., etc. Nom. Cap.: £500 in £1 shares.

GUY MOREL AND COMPANY, LIMITED. (249221.) 10, Cross Lane, Eastcheap, E.C. 3. To carry on the bus. of provision mchts., pork butchers, etc. Nom. Cap.: £1,000 in £1 shares.

F. WILKINS (1930), LIMITED. (249219.) 192, Old Christchurch Road, Bournemouth. To carry on the businesses of bakers, confectioners, and caterers formerly cd. on by E. A. Buckley and F. Wilkins, Ltd. Nom. Cap.: £100,000 in £1 shares.

H. R. AND S. SAINSBURY, LIMITED. (249154.) To take over the bus. of wholesale and retail grocers and provision mchts., etc., cd. on at Trowbridge, Salisbury, and Bradford-on-Avon, Wilts., as "J. Sainsbury and Co." Nom. Cap.: £50,000 in £1 shares (20,000 pref. and 30,000 ord.).

J. B. WILLIAMS AND COMPANY, LIMITED. (249223.) To take over the bus. of a wholesale provision mcht. cd. on at The Quay, Gloucester, as "J. B. Williams and Co." Nom. Cap.: £22,000 in £1 shares.

W. PEARSON AND COMPANY, LIMITED. (249162.) To take over the businesses of grocers, farmers, and genl. dlrs. cd. on at Paddock Wood, Kent, by W. Pearson, and by H. S. Golden and Lilian J. Pearson (trading as W. Pearson and Co.). Nom. Cap.: £10,000 in £1 shares.

FLAVOURS, LIMITED. (249082.) Dominion House, Bartholomew Close, E.C. To carry on the bus. of mnfrs. of fruit essences and flavouring materials, etc. Nom. Cap.: £1,000 in £1 shares.

Current Literature

Fruit and Vegetable Products

290. General Principles of Retort Operation. K. L. Ford. (*Fruit Prod. J.*, 1930, July, p. 305.)
291. Prepared Fresh Apples for Bakers' Use. M. A. Joslyn and E. M. Mrak. (*Ibid.*, p. 309.)
292. The Processing of Candied and Glaced Fruits —Cherries. S. Blumenthal and L. Thuor. (*Ibid.*, p. 312.)
293. The Modern Trend in Spicing and Flavouring. H. Bennett. (*Ibid.*, p. 314.)
294. Changes in the Pectic Constituents of Apples in Relation to Softening. M. H. Haller. (*Jour. Agr. Res.*, 1929, Vol. 39, No. 10, p. 739.)
295. The Antiscorbutic Potency of Apples. Bracewell, Hoyle and Zilva. (*Biochem. Jour.*, 1930, Vol. 24, No. 1, p. 82.)
296. The Preservation of the Antiscorbutic Vitamin in Lemon Juice. J. Williams and J. W. Corran. (*Ibid.*, p. 37.)
297. Packing Citrus Fruits. E. D. Stewart. (*Food Ind.*, 1930, July, p. 292.)
298. Vitamin C in Fresh and Canned Tomatoes. B. Clow and A. Martlatt. (*J. Agric. Res.*, 1930, p. 767.)

Cereal Products

299. Vitamin Potency of Rice. J. P. Spruyt. (*Chem. Weekblad.*, 1930, May 17, p. 298.)
300. Some Comparisons between Commercially and Experimentally Milled Flours. Pascoe, Gortner and Sherwood. (*Cereal Chem.*, 1930, May, p. 195.)
301. Colloid Chemistry of Gluten. H. Bungenberg de Jong and W. Klaar. (*Ibid.*, p. 222.)
302. The Effect of Acid Potassium Tartrate as an Ingredient in Angel Cake. E. Grewe and A. M. Child. (*Ibid.*, p. 245.)
303. Fat: Its Estimation in Wheaten Products. C. W. Herd and A. J. Amos. (*Ibid.*, p. 251.)
304. A Comparative Study of the Non-Gluten Constituents of Soft and Hard Wheat Flours. H. Hall. (*Ibid.*, p. 270.)
305. Standardising the Granulation Test for Flour. J. Micka and K. Vrana. (*Ibid.*, p. 280.)
306. A Volume Measuring Apparatus for Small Loaves. J. G. Mallock and W. H. Cook. (*Ibid.*, p. 307.)
307. Dough Making. W. P. Ford. (*Arkady Rev.*, 1930, July, p. 58.)
308. The Colloid Chemistry of Bread-Making. R. Whymper. (*Ibid.*, p. 79.)
309. Chemical and Physico-chemical Changes induced in Wheat and Wheat Products by Elevated Temperatures, II. and III. W. F. Geddes. (*Canad. J. Res.*, 1930, 2, pp. 65, 195.)
310. Bacteriology of Wheat and Flour. D. W. Kent-Jones and A. J. Amos. (*Analyst*, 1930, p. 248.)

Dairy Products

311. Bactericidal Properties of Milk. S. Orla-Jensen and J. Jacobsen, *Zentbl. f. Bakteriologie*, 1930, March 24, p. 321.)
312. Studies on the Destruction of Vitamin C in the Boiling of Milk. Schwartze, Murphy, and Haun. (*Jour. of Nutrition*, 1930, March, p. 325.)
313. The Freezing Point of Milk as a Means of Detecting Added Water. G. D. Elsdon and J. R. Stubbs. (*Analyst*, 1930, July, p. 423.)

Various

314. Ridding the Plant of Rats. C. V. Akin. (*Food Ind.*, July, p. 298.)
315. Importance of Traces of Sulphur on Corrosion of Food Containers. R. W. Clough and O. E. Shostrom. (*Ibid.*, p. 310.)
316. Enzymes of Green Malt. R. H. Hopkins and J. A. Burns. (*Jour. Inst. Brewing*, 1930, Vol. 36, p. 9.)
317. Yeast Growth. F. Marboe. (*Zentbl. f. Bakteriologie*, 1930, May 20, p. 67.)
318. Vitamins and the Food Industry. A. Bakke. (*Chemie et Ind.*, 1930, March, p. 516.)
319. Aluminium and the Preserving Industry. C. Bidault and S. Blaignan. (*Rev. hyg. méd. prév.*, 1930, p. 122.)
320. Mayonnaise. W. M. Brownell. (*Oil and Fat Industries*, 1930, March, p. 99.)
321. Red Colour of Oil in Preserved Sardine Tins. G. Hinard and M. Boury. (*Ann. Falsif.*, 1930, p. 216.)
322. Fermentation by Yeast Preparations. A. Harden and M. G. Macfarlane. (*Biochem. J.*, 1930, p. 343.)
323. Methods of Investigating the Heating and Ventilation of Factories. H. M. Vernon. (*J. Nat. Inst. Industrial Psychology*, 1930, July, p. 138.)
324. Further Observations on the Relation of Carotene to Vitamin A. J. C. Drummond, B. Ahmad, and R. A. Morton. (*J.S.C.I.*, 1930, No. 27, p. 291T.)

Analysis

325. The Routine Detection of Nitrates in Milk. A. F. Lerrigo. (*Analyst*, 1930, July, p. 433.)
326. Separation and Determination of Solid Fatty Acids in Edible Fats. J. Grossfeld and A. Simmer. (*Z. Unters. Lebensm.*, 1930, p. 237.)
327. Hydrogen Cyanide in Lima Beans. S. K. Hagen. (*Ibid.*, p. 211.)
328. Measurement of Colour in Red Wines. L. Roos. (*Ann. Falsif.*, 1930, p. 207.)

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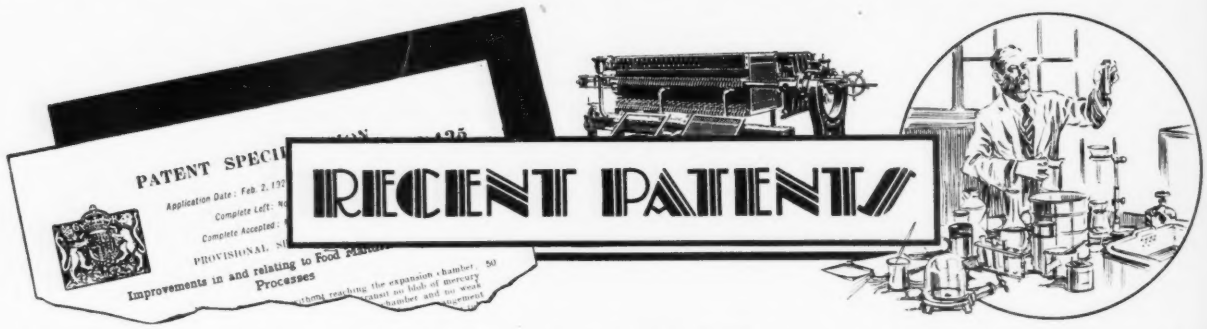

These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents, and are published by permission of the Controller of H.M. Stationery Office.

Latest Patent Applications

19993. CARVER, F. S.: Machine for finishing chocolate, etc. July 1.

20222. MACKENZIE, A. F.: Sweetmeats. July 3.

19372. (BATEMAN, C. S.) and BATEMAN TEA STALK SEPARATOR CO., LTD. Treatment of tea. June 25.

19756. GRANDSEIGNE, R. H., and PAUL, R.: Obtaining white and purified pectine. June 28.

19229. HUTCHINSON, E. L.: Confections. June 24.

Specifications Published

330,927. HARTMANN, C. W.: Method and means for proofing cartons and like packages.

330,999. BENOIT, L.: Cartons for eggs and like commodities.

331,021. ROBINSON, F. G., RAWLINS, J. D., and PAPER SACKS, LTD.: Method of and means for packing or protecting bananas.

331,161. TARNAWSKI, F.: Methods of preserving gherkins and the like.

330,597. WALWYN, G. F., WALWYN, F., and WALWYN, G. H.: Cooling apparatus for preserving milk and other foodstuff, also applicable as a sterilizing apparatus for milk.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstract Published

328,734. **Extracting palm and like oils.** VEGETABLE OIL MACHINERY SYNDICATE, LTD., and MOORES, J., 14, Ridgefield, John Dalton Street, Manchester.

Fatty Oils, Extracting.—In the extraction of oil from palm fruit and similar oil seeds the fruit is cooked by steam in a vessel having a false bottom, through which the steam passes. The cooked fruit is then pressed to extract oil therefrom, and the extracted oil is heated to about 200° F. and filtered. In a modification the cooked fruit is depulped and the pulpy material is heated before pressing, etc. The process may be applied to ground, wood, or shea nuts, or to soya beans, copra, or sunflower, sesame, linseed, or mustard seed.

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office.

SUNNY PEAK.—512,572. **Canned fruits and canned vegetables.** ALLIED SUPPLIERS, LTD., 196, City Road, London, E.C. 1. July 9.

GOLDEN KEY.—505,383. **Sauces.** A. J. BROWN AND SONS, 47-49, Key Hill, Birmingham. July 9. (Associated.) (By Consent.)

GOLD LEOPARD.—512,863. **Tea.** MITSUI AND CO., LTD., 31, 32, and 33, Lime Street, London, E.C. 3. June 25.

SUNNY CLIME.—512,346. **Butter.** TRENGHOUSE AND NATHAN, LTD., 51 to 55, Tooley Street, London, S.E. 1. June 25.

GNOME.—510,311. **Cheese.** FARNER AND CO., Aktiengesellschaft, Guterstrasse No. 11-20, Langenthal, Switzerland. June 25.

SESAME.—513,169. **Eggs.** PETER LACROIX AND SON, LTD., The Sussex Egg Market, 42, George Street, Brighton, Sussex. June 25.

London Gazette Information

TRADE BOARDS ACTS, 1909 AND 1918

SUGAR CONFECTIONERY AND FOOD PRESERVING TRADE BOARD (GREAT BRITAIN)

Proposal to Vary certain Overtime Rates for Male and Female Workers.

In accordance with the Regulations made under Section 18 of the Trade Boards Act, 1909, by the Minister of Labour, and dated 21st April, 1927, the Sugar Confectionery and Food Preserving Trade Board (Great Britain) hereby give notice that they propose to vary the Overtime Rates set out in their Notice F (11), dated 6th April, 1923, for Male and Female Workers in respect of time worked on certain Holidays.

Particulars of the Proposed Variation of Overtime Rates may be obtained on application to the Secretary of the Trade Board.

In accordance with Section 3 (5) of the Trade Boards Act, 1918, the Trade Board will consider any Objections to the above Proposal to Vary, which may be lodged with them within two months from the 1st July, 1930. Such Objections should be in writing and signed by the person making the same (adding his or her full name and address), and should be sent to the Secretary, Sugar Confectionery and Food Preserving Trade Board (Great Britain), 1, Whitehall Gardens, London, S.W. 1. It is desirable that Objections should state precisely, and so far as possible, with reasons, what is objected to.

MERCHANDISE MARKS ACT, 1926

His Majesty in Council has approved four Orders in Council under the above Act, entitled:

Merchandise Marks (Imported Goods) No. 2 Order, 1930
" " " " No. 3 " "
" " " " No. 4 "
" " " " No. 5 " "

Copies of the Orders, when published, may be purchased from H.M. Stationery Offices.